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- MiniTower Chassis
- 512KB Single Bank Pipeline Burst Cache
- 64MB 100MHz SDRAM
- 10GB Ultra ATA Hard Drive
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- Yamaha 64 Voice Wavetable Integrated Sound
- 32X Variable EIDE CD-ROM Drive
- Harman Kardon HK195 Speakers
- 17" Colour Monitor (15.9" v.i.s.)
- Microsoft® IntelliMouse™
- Microsoft® Windows® 98
- McAfee Virus Scan
- 56K Capable U.S. Robotics X2 WinModem
- 3Year Limited Warranty

**\$3,069\***

or \$26 per week\*\*

Upgrade options:

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- Altec Lansing ACS-495 Full Dolby® Surround Sound Speakers with Subwoofer \$164

### NEW DELL DIMENSION® XPS V350 INTEL® PENTIUM® II PROCESSOR 350MHz

- MiniTower Chassis
- 512KB Single Bank Pipeline Burst Cache
- 64MB 100MHz SDRAM
- 6.4GB Ultra ATA Hard Drive
- 3.5" 1.44MB Diskette Drive
- Intel® 10/100 PCI Ethernet Controller
- ATI® 8MB 3D AGP Integrated Graphics
- 32X Variable EIDE CD-ROM Drive
- 17" Colour Monitor (15.9" v.i.s.)
- Microsoft® IntelliMouse™
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- ATI® 8MB 3D AGP Integrated Graphics
- 32X Variable EIDE CD-ROM Drive
- 17" Colour Monitor (15.9" v.i.s.)
- Microsoft® IntelliMouse™
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- 24X Variable CD-ROM Drive
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- 512KB Single Bank Pipeline Burst Cache
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- 3.5" 1.44MB Diskette Drive
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- Integrated Ultra2/Wide and Ultra Wide SCSI Controllers
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- 32X Variable SCSI CD-ROM Drive
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- Free Lifetime Technical Support

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- 3.5" 1.44MB Diskette Drive
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- STB nVidia ZX 8MB 3D 2X AGP Graphics Card
- Turtle Beach Montego A3D64 Voice PCI Sound Card
- 40X Variable EIDE CD-ROM Drive
- 19" Colour Monitor (17.9" v.i.s.)
- Microsoft® IntelliMouse™
- Microsoft® Windows® 98
- McAfee Virus Scan
- 56K Capable U.S. Robotics X2 WinModem
- Iomega Zip 100MB Internal Drive
- 3 Year Limited Warranty

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or \$42 per week\*\*

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#### NEW DELL DIMENSION® XPS R450 INTEL® PENTIUM® II PROCESSOR 450MHz

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- STB nVidia ZX 8MB 3D 2X AGP Graphics Card
- Turtle Beach Montego A3D64 Voice PCI Sound Card
- 40X Variable EIDE CD-ROM Drive
- Harman Kardon HK 195 Speakers
- 17" Colour Monitor (15.9" v.i.s.)
- Microsoft® IntelliMouse™
- Microsoft® Windows® 98
- McAfee Virus Scan
- 56K Capable U.S. Robotics X2 WinModem
- 3 Year Limited Warranty

**\$4,089\***

or \$35 per week\*\*

Upgrade options:

- 19" Colour Monitor (17.9" v.i.s.) \$461
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- 3.5" 1.44MB Diskette Drive
- ATI® XPERT 98D 8MB 3D 2X AGP Graphics Card
- Turtle Beach Montego A3D64 Voice PCI Sound Card
- 40X Variable EIDE CD-ROM Drive
- Harman Kardon HK195 Speakers
- 17" Colour Monitor (15.9" v.i.s.)
- Microsoft® IntelliMouse™
- Microsoft® Windows® 98
- McAfee Virus Scan
- 56K Capable U.S. Robotics X2 WinModem
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- DVD-ROM Drive and Decoder Card \$226

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- NEW 8GB Ultra ATA Hard Drive
- 3.5" 1.44MB Diskette Drive
- 8MB ATI® RAGE LT PRO 2X AGP Video Controller
- High-fidelity Audio SoundBlaster Compatible
- 2X DVD-ROM and Decoder Card
- 14.1" XGA Colour TFT Display
- Microsoft® Windows® 98
- 56K Data/Fax Modem
- Deluxe Carrying Case
- Second Battery
- 1 Year Limited Warranty

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Upgrade options:

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- 4.0GB Ultra ATA Hard Drive
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- 24X Variable CD-ROM Drive
- 14.1" XGA Colour TFT Display
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- Deluxe Carrying Case
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- 128-bit Graphics Accelerator
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- 13.3" XGA Colour TFT Display
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- STB nVidia ZX 8MB 3D 2X AGP Graphics Card
- Turtle Beach Montego A3D64 Voice PCI Sound Card
- 40X Variable EIDE CD-ROM Drive
- 19" Colour Monitor (17.9" v.i.s.)
- Microsoft® IntelliMouse™
- Microsoft® Windows® 98
- McAfee Virus Scan
- 56K Capable U.S. Robotics X2 WinModem
- Iomega ZIP 100MB Internal Drive
- 3 Year Limited Warranty

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- 17" Colour Monitor (15.9" v.i.s.)
- Microsoft® IntelliMouse™
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- 56K Capable U.S. Robotics X2 WinModem
- 3 Year Limited Warranty

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Upgrade options:

- Altec Lansing ACS-495 Dolby® Surround Sound Speakers with Subwoofer \$164
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- Turtle Beach Montego A3D64 Voice PCI Sound Card
- 40X Variable EIDE CD-ROM Drive
- 17" Colour Monitor (15.9" v.i.s.)
- Microsoft® IntelliMouse™
- Microsoft® Windows® 98
- McAfee Virus Scan
- 3 Year Limited Warranty

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## ● Disc 1

### FIRST TAKE

FunnelWeb 2.02

### OFFICE SWEETS

**Microsoft Office** Avery Wizard ■ Kurzweil Voice Commands for Word ■ Microsoft Access 97 Report Snapshot and Snapshot Viewer ■ Microsoft Access 97 Web Tracker Database ■ Microsoft Draw 98 ■ Microsoft Excel 97 Dialog Converter ■ Microsoft Excel 97 Personal Budgeter Template ■ Microsoft Excel 97 Quattro Pro File Converter ■ Microsoft Excel 97 Timedcard Template ■ Microsoft Excel 97 Viewer ■ Microsoft Excel 97 Web Connectivity Kit ■ Microsoft Excel 97 Weblinks Help file ■ Microsoft Excel Internet Assistant Wizard Add-in ■ Microsoft Money Link to Excel 97 ■ Microsoft Office 97 Assistants ■ Microsoft Office 97 Service Release 1 ■ Microsoft Outlook 97 3-Pane Extension ■ Microsoft Outlook 97 Import/Export Converters ■ Microsoft Outlook 97 Mail Attachment Security Add-on ■ Microsoft Outlook 97 Rules Wizard ■ Microsoft Outlook 97 Weblinks Help file ■ Microsoft Outlook 98 Security Update ■ Microsoft Outlook 98 Stationery ■ Microsoft Outlook Express Security Update for IE 4.01 SP 1 ■ Microsoft PowerPoint 4 Viewer for the Mac ■ Microsoft PowerPoint 95 Animation Player for ActiveX ■ Microsoft PowerPoint 95 Translator for PowerPoint 4 for the Mac ■ Microsoft PowerPoint 97 3-D Rotation Add-in ■ Microsoft PowerPoint 97 Animated Templates ■ Microsoft PowerPoint 97 Converter for PowerPoint 95 ■ Microsoft PowerPoint 97 Numbered Bullets Add-in ■ Microsoft PowerPoint 97 Translator for PowerPoint 4 ■ Microsoft PowerPoint 97 Weblinks Help file ■ Microsoft PowerPoint 97-98 Import Converter for PowerPoint 4 for the Mac ■ Microsoft PowerPoint Viewer 97 ■ Microsoft Word 6.0/95 Binary Converter for Word 97 ■ Microsoft Word 97 Customer Invoice Template ■ Microsoft Word 97 Document Converter ■ Microsoft Word 97 Internet Lookup Template ■ Microsoft Word 97 Press Release Templates pack ■ Microsoft Word 97 Research Templates pack ■ Microsoft Word 97 Sales and Marketing Template pack ■ Microsoft Word 97 Viewer ■ Microsoft Word 97 Weblinks Help file ■ Microsoft Word 97-98 Import Converter for the Mac ■ Power Utility Pak 97 ■ **Lotus SmartSuite** Lotus FastSite Publisher for PowerPoint ■ Lotus Freelance Screen Show Mobile Player ■ Lotus Web Screen Show Player ■ Updated Spell Checker DLL ■ Lotus ScreenCam Player ■ WordPerfect to Lotus Word Pro 97 Switch Kit ■ **Corel WordPerfect Suite 8** Corel WordPerfect Suite 8 Conversion Update ■ Corel WordPerfect Suite 8 Password Fix ■ Corel WordPerfect Suite 8 Remove Markings Macro ■ Corel WordPerfect Suite 8 Service Pack 1 ■ Corel WordPerfect Suite 8 Service Pack 2 ■ Corel WordPerfect Suite 8 Service Pack 4 ■ Corel WordPerfect Suite 8 Update Guide ■ Corel WordPerfect Suite 8 Viewer Plug-in ■ Macros Manual for Corel WordPerfect 8 and Corel Quattro Pro 8 ■ QuickArt Database Converter

### SUPERCHARGE OFFICE 97

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### GAMEZONE

Xenocracy ■ Trophy Bass 2 ■ MotorCross Madness

### WORKSHOP

**Windows** Office Toys 98.2 ■ The Spreadsheet Assistant 4.0 ■ The Risk Analyzer 7.4.98 ■ WordWeb Pro 1.6 ■ Woody's Office Power Pack for Word 97 1.4 (WOPR) ■ **OS/2** System Resources 3.31 ■ PMPatrol ■ PMSysMon ■ System Information Pad ■ **Mac** Hotline 1.2.3 ■ Kaleidoscope 2.0.1 ■ OTTool 1.0 ■ StuffIt Expander 4.5 ■ DropStuff with Expander Enhancer 4.5 ■ Graphic Converter 3.3.1 ■ Patched VFW Utilities 1.1 ■ **Linux** POV-Ray ■ Seed ■ Moonlight Creator ■ Blender ■ Blue Moon Rendering Tools

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### BROWSERS

Microsoft IE 4.01 SP1 ■ Microsoft Internet Explorer 4.0 ■ Microsoft IE 3.03 ■ Microsoft IE 3.02 ■ Netscape Communicator PR 4.5 ■ Netscape Communicator 4.06 ■ Netscape Navigator 4.06 ■ Netscape Navigator 2.02 International Version

### BANDWIDTH BUSTERS

DirectX Drivers 6.0 ■ AltaVista Discovery ■ Adobe Premiere ■ Outlook Express Security Update for IE 4.01 ■ Outlook Express Security Update for IE 4.01 SP 1 ■ Outlook 98 Security Update ■ WinFax 9.0 ■ Norton AntiVirus 5.0

### INTERNET TOOLKIT

CuteFTP 2.5 ■ CRT 2.2 ■ Eudora Lite 3.0.6 ■ Hogwashed 1.0.3 ■ mIRC 4.51 ■ QuickFinger 1.0.2

### ISP KITS

Telstra BigPond ■ Dynamic Bell

## ● Disc 2

### TAKING CARE OF BUSINESS

Advanced Point of Sale 5.23b ■ Aegis 3.63 ■ Atrex 6.01 ■ Blaze Job Costing 1.3 ■ CallTrak Customized Edition 5.2 ■ Chartist 1.9 ■ Control Your Business 98 3.52 ■ East Staff 1.52 ■ Eric HRIS 6 ■ FastTrack Schedule 5.02 ■ Flow Charting PDQ Lite 1.1 ■ Home/Office Inventory Book 5.0 ■ HR Employees 2.0 ■ HR Suite 2.1 ■ Inspiration: Professional Edition 5.0 ■ Internet Message Centre 1.0 ■ Invoice 98 1.504 ■ InvoWiz 95 1.53 ■ iTrack Workgroup 1.3b ■ Membership Librarian 98 1.6a ■ MinuteMan 4.9 ■ Smart Clock ■ Project KickStart 2.02 ■ Reminders 3.3 ■ Request Tracker 1.03 ■ Small Business Inventory Control 3.0 ■ SmartDraw 3.24 ■ Taskkey Multi-Manager 2.5 ■ TimeKeeper 1.5 ■ Timeless Time and Expense 1.21 ■ VisiMap 2.5c ■ Visual Staff Scheduler Pro 3.0 ■ WN Help Desk 2.8.2

### DIY OFFICE SUITE

1st Contact 1.08.02 ■ Above & Beyond 98 ■ Act 4.0 ■ ADR\_Book 5.3 ■ As-Easy-As 1.6 ■ AutoSpell 5.3.3 ■ Bill's Calendar 1.30 ■ Business Card Designer Plus 5.5 ■ Business Cards 4.19 ■ Calendar+ 1.08.07 ■ CardBase 2.8 ■ Client Tracks 2.6 ■ Contact Browser 4.5 ■ Contact Plus Personal 97 2.3 ■ CWordPad 1.22 ■ Digital Pad 3.0 ■ Easy Mail 2.1 ■ Easy Word 10.4 ■ EditPad 3.3.2 ■ Electronic Assistant Lite 2.1 ■ Final Writer 1.01 ■ GS-Calc 4.0 ■ Integra Office 2.6 ■ Jot98 ■ Just the Fax 2.8 ■ NotePad Plus 1.11 ■ NoteTab Pro 4.01 ■ Penpad 5.0b ■ Perfect Keyboard ■ Phonadex 95 2.00 ■ QuickSpell 1.0.05 ■ ReadyToPrint Organizer 3.07 ■ Redsoft Smart Panel 1.2.2 ■ Rubberband Autoresponder 3.0 ■ Schedule Wizard 98 1.7d ■ SDSS Spreadsheet 1.05 ■ SuperMail 2.8 ■ TextPad 3.2.5 ■ The Journal 1.51 ■ Time & Chaos32 5.3.4 ■ ToDo95 4.12 ■ UltraEdit32 5.2 ■ Visual Day Planner 6.01 ■ Visual Envelopes 2.8 ■ WordExpress 2.02 ■ WordMagic 2.0 ■ WordWeb 1.6.01 ■ WriteExpress Easy Letters 2.1 ■ Yeah Write 1.4 ■ YourTraySpell 1.1

### REVIEWS

Lotus SmartSuite Millennium Edition Release 9 Trial Version

### BROWSERS

Microsoft IE 3.03 ■ Microsoft IE 3.02 ■ Netscape Communicator 4.06 ■ Netscape Navigator 4.06

### ISP KITS

TPG Internet



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## Opening the umbrella

APC – the next generation.

By Jeremy White

**E**very now and then we use this editorial page to talk to our readers about the magazine itself, rather than the topics it covers. This month we are launching the first of a number of new ventures under the apcmag umbrella. As a magazine we try very hard to be driven by our readers and their feedback. All of our new ventures are based directly on the feedback you've given us over the past two years, and we hope they will complement the main magazine, and help to make it ever more useful to you.

The first of these is apcmag's **Newswire** site, which is under the editorship of veteran APC news editor, a driving force behind our main Web site, Angus Kidman. One of the most popular features of the **apcmag.com** site has been the six to 10 Australian IT news stories and Web features we post every day. We're expanding this coverage into a full and dedicated Australian technology news service.

Many of our readers already use US sites like ZDNet, PC Week, CNet and US ComputerWorld, and there is no reason to rehash stories that our readers have already read from the US online. But you've told us very clearly that Australian content and perspective (where relevant) are very important, and that there is a real gap in the market for high-quality and timely coverage of computing news with an Australian focus and from an Australian perspective. **Newswire** is our attempt to service that need. We hope you'll check out the new site at <http://newswire.com.au>, and let us know what you think of the service and how we can develop and improve it.

The second of our new ventures is a new family of titles under the **apcmag.pocketbook** banner, which is under the editorship of APC's long-time workshop editor, Ashton Mills. We've been trialling the pilot, the *Windows 98 Pocketbook* on news-

stands over the last six weeks, and the positive feedback indicates this could be a really useful series to readers. The basic aim of the **apcmag.pocketbook** series is to provide very focused guidebooks providing 'everything you need and nothing you don't' on a particular topic. All the advice and guidance is in the book, and all the tools you need are on the cover CD.

The pocketbooks are based on the style of hands-on, how-you-do-it content that is so popular in Workshop, but they allow us to provide a much greater level of detail than we could ever fit into a monthly magazine. The second in the series, the *Linux Pocketbook* – which will include a full custom APC distribution of Red Hat's Linux package on its cover CD – will be available on newsstands in late October. This will be followed by a pocketbook on how to

the big downloads we don't have space for – even on a double **apcmag.cd**.

The aim with all three of these new titles is to complement the main monthly magazine. There are some things that you just can't do in a monthly title; it has relatively long lead times, there are a lot of topics to cover in restricted space, and it just isn't suited to breaking news or really hot topics. **apcmag.pocketbook**, **Newswire** and **CD Week** allow us to keep the features that you tell us you love about the main title, while creating complementary products that address the areas that a monthly magazine just can't deliver.

We hope you'll keep an eye out for these new ventures, tell us what you think, and help us to make them as useful and relevant as possible for our readers.

### Many magazines forget their readers, and they suffer the consequences.

upgrade your PC in the lead-up to Christmas. Over the following months, you'll also see pocketbooks on home and small business networking, Microsoft Office 2000, digital imaging and much more.

And finally, there's **CD Week**, which launches in October, and is being edited by Andrew Broadhead, who has been producing the very popular **apcmag.cd** every month.

**CD Week** is a CD magazine, available from newsagents and on subscription, providing 'all the best from the Net every week'. The two big challenges we face with APC's cover CDs are the lead times for material for a monthly magazine, and the sheer volume of new and hot material that is worth reviewing and including each month. **CD Week** is a low-priced, really up-to-date CD with all the hottest releases without the wait, and all

I would also like to thank you for your support for the magazine while it's been through so many changes. Since its relaunch over two years ago as a paper/Web/CD entity with 100% Australian content, our audited circulation has grown more than 80%. Some recent issues have sold more than 80,000 copies, and the **apcmag.com** Web site now has more than 450,000 users every month. This support and — as one reader put it — the "bouquets and brickbats" you send us every month are our lifeblood. Many magazines forget their readers, and they suffer the consequences. We're determined not to. Without your support, there would be no magazine.

You can reach Jeremy White at [jwhite@apc.com.au](mailto:jwhite@apc.com.au).



## NEWSWIRE

21

Net up, PCs down	21
IT cast aside by politics	21
News Roundup	24
Tax office clampdown	24
Satellite proposal 'not the way to go'	24
Crime time online	26
The search for authentication	26

## NEWS ANALYSIS

The election in which nobody wins	27
How XML is changing applications	24

## FORUM

46

EDITORIAL	6
-----------	---

READERS' SAY	46
--------------	----

## TWO BITS WORTH

Helen Dancer	
On the threshold	48
Jeremy Horey	
Niche media and the Net	50
Bruce McCabe	
Small is beautiful	52
John Sterlicchi	
To Be, or not	54

## PRICE WATCH

The need for speed	56
--------------------	----

## SERVICE AND RELIABILITY

The things we do	58
------------------	----

## REPROGRAMMING

Switch them off	60
-----------------	----



## FAMILY

Who uses what in 1998?	62
------------------------	----



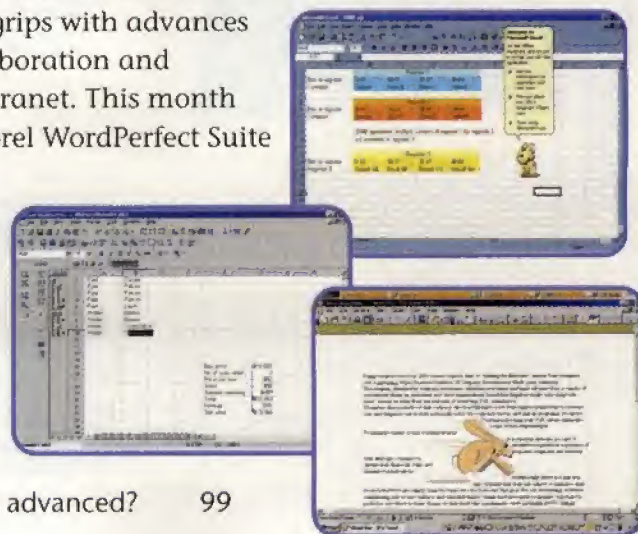
## THE RIGHT STUFF

Often we're not in charge of our own destiny when it comes to which desktop office productivity suite we use. Even so, it helps to know how to best use whatever it is that we do have, as well as how to come to grips with advances in features such as collaboration and publishing across an intranet. This month we take a look inside Corel WordPerfect Suite 8 with Dragon NaturallySpeaking, Lotus SmartSuite Millennium Edition and a beta of Microsoft Office 2000.

By Stephen Withers

### Office Suites

How far have office suites advanced?	99
--------------------------------------	----





## FEATURE

64

## LOOKING TOWARDS ASIA

How is IT business faring in South-East Asia and India? We update you on the state of play.

By Helen Dancer

Singapore: Intelligent island	70
Malaysia: Hard sell	72
Korea: Think big	76
Taiwan: Risky business	78
Hard hit economies	82
Hong Kong: The tiger's tale	84
Asia's silicon valleys	88
India: An investment in the future	92



## HARDWARE

111

## ASTOUNDING SOUNDS

PCI soundcards for getting the most out of your PC's sound system

By Jeremy Torr

Editor's Choice	111
How we tested	114



Aztech PCI 338-A3D	112
Creative Graphics Sound Blaster PC164	112
Creative Graphics Sound Blaster PC1128	112
Diamond Monster Sound MX200	114
Diamond Sonic Impact	114
Pine PCI Digital Aureal	116
Pine PCI Solo	116
Terasound 128 PCI	116
Terasound A3D PCI	118
Turtle Beach Montego A3DXstream	118
Xitel Storm VX	120
Yamaha WaveForce 192XC	120



## TECHNICAL

95

## BIGGER, BETTER, BRIGHTER, FASTER

Chip developers are beefing up 3D graphics using multimedia instruction sets.

By Nathan Taylor

## SOFTWARE

99

## THE RIGHT STUFF

The latest advancements in the best known, and also some of the more obscure, software suites.

By Stephen Withers

Other suites, other platforms	108
-------------------------------	-----

Corel WordPerfect Suite 8	
with Dragon NaturallySpeaking	100
Lotus SmartSuite Millennium Edition	102
Microsoft Office 2000	106

**Lotus SmartSuite**  
Full working version on  
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## PICK A CARD

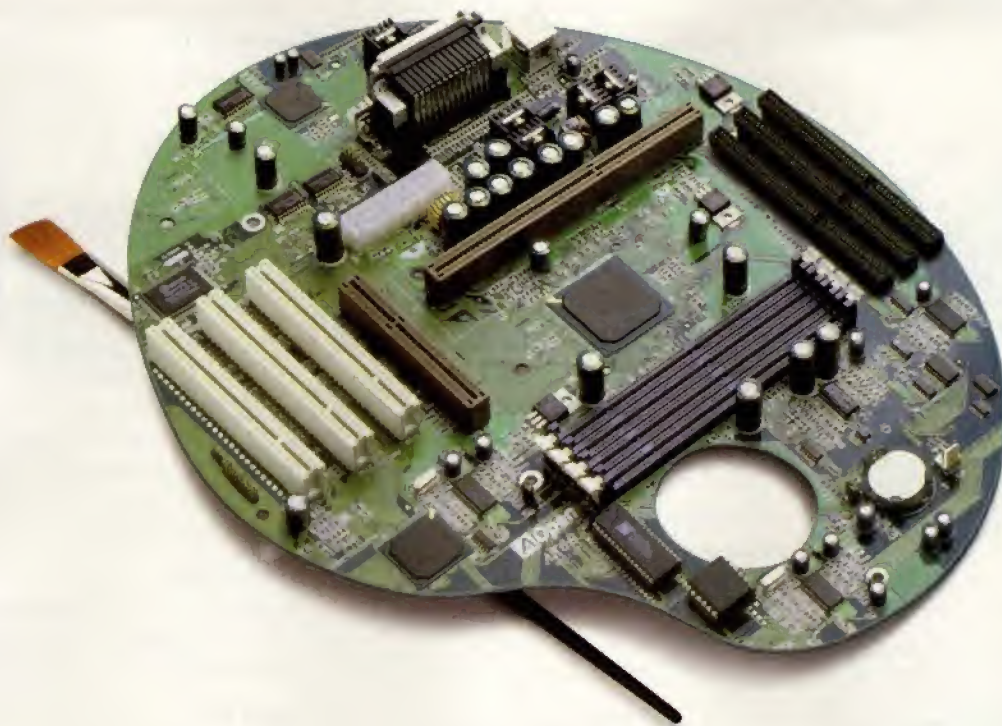
AGP cards that add a new dimension to PC graphics.

By APC staff

Editor's Choice	128
How we tested	130
New chip technologies	137

Asus AGP-V2740	128
Asus AGP-V3000ZXTV	128
ATI All-in-Wonder Pro	130
ATI Xpert 98	130
Diamond Stealth II G460	131
Hercules Terminator 2x/i	131
Leadtek WinFast 3D S900	131
Matrox Millennium G200	133
Matrox Mystique G200	133
GDI Amazing-1 AGP 3D	135
STB Velocity 128	135
Hercules Terminator Beast	137
Diamond Viper V550	137





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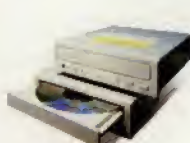
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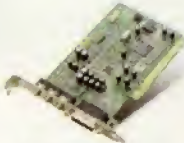
**"...it's a dream board for performance enthusiasts."**  
Editors Choice - apc mag - BX Motherboard test July '98



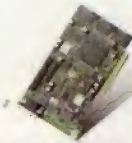
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## FIRST TAKE

32

## APPLE IMAC

Apple's great white hope.

32



## DELL DIMENSION XPS

An attractive Pentium II alternative.

34

## MPMAN

Portable audio using MPEG.

36



## COREL PRINT OFFICE

Publishing package that gives smooth results.

38

## GATEWAY G6-450XL

The first 450MHz Pentium II past the post.

40

## CANON BJC-50

A tiny notebook ideal for travellers.

42



## FUNNEL WEB 2.02

A tool for tracking Web site usage.

42

## PANASONIC KX-PS8000

Network-capable colour laser.  
The Gadget File

44

44



## AFTER HOURS

203

## BIBLIOFILE

Ecommerce

203



## INTERACTIVE

The Human Body — Your Body, based on the groundbreaking TV series;

plus other titles

207

Interactive News

208

## GAMEZONE

Descent: Freespace, The Great War;

MechCommander; Might and Magic VI;

The Mandate of Heaven; plus more

209

## WEB FILE

The food of life

213

Surfbaud: The year punk broke

214

## CHIP CHAT

The exodus from Silicon Valley to

Hollywood

216

Contest: Technology Gag of the

Month

216

## ADVERTISERS' INDEX

14

## CREDITS

18

## CD CONTENTS

19

## CD INFORMATION

201

## CONTACT INFORMATION

18, 201

## WORKSHOP

141

## CONTENTS

Contest: Bug of the Month

141

## TECH TALK

Technobabble: The graphics card

142

By Nathan Taylor

Step by Step: Hardware upgrades

146

By Daniel Rutter

## OPERATING SYSTEMS

Windows 95: Security

152

By Kieran McNamee

OS/2: Healthy Win-OS/2

154

By Christopher Relf

Mac OS: Java on the Mac

156

By Stephen Withers

Linux: Email servers

158

By Geoffrey Bennett

## PROGRAMMING

Developers Corner: A return to printers

162

By Michael Smith

JavaScript: Series wrap-up

164

By Travis Simon

HyperText: Fixing misalignment

166

By Lee Borkman

## SHAREWARE

Shareware summary

168





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## Advertising index

Adaptec	39	Gateway	4, 5	Ocean Office	150, 151	Synnex	172
Ado Electronics	149	Gigabyte	132	Officeworks	83	Optima	173
American Power	97	Global	206	Olympus	115	JMB Wholesale	174
Apple Centres	89	Hallmark	147	Optima	87, 119		
ASP	134	Hewlett-Packard	59	Panasonic	77	<b>SUPERMARKET</b>	
Auscom	126	Hyundai	123	Powerquest	37	Dietner	175
Beyond	129	IBM	15, 16, 25	Samsung Australia	118, 120, 122	City Software	176, 177
Bond University	14	Imation	73	Samsung	106, 108, 113	New Reality	178, 179
Brains	101	Intel	6, 7, 66, 67	Servex	11, 75, 109, 125	DMA	180
Brother	15	KOA Group	107	Sony	35	MOSA	181
Canon	41, 43, 45, 47, 49, 51, 53, 55	Kodak	81	Symantec	63	Dragon Dictate	182
Compaq	28, 29	LG Electronics	117	Telstra Big Pond	2, 3, 69, 71	Take 7	183
Corel	103	Macase	90, 91	TPGI	79	Q Plus	184
Cybec	131, 133, 135	Maxwell	93	ViewSonic	136	Sigmacom	185
Daewoo	33	Microgram	211	VME	155	Rosemary Media	186
Dell	IFC, gatefold, 23, 57, 85	Microsoft	31	Westan	13	DMA	187
Diamond	94	Mira Networking	96			Corporate Software	188, 189
Elite	98	Mitsubishi	61	<b>CHANNEL</b>			
Epson	121	Natcomp	105	AVO	169	<b>MARKETPLACE</b>	<b>191-200</b>
Focal Point	215	NEC	20	Espco	170		
		Net Registry	140	Edge	171		

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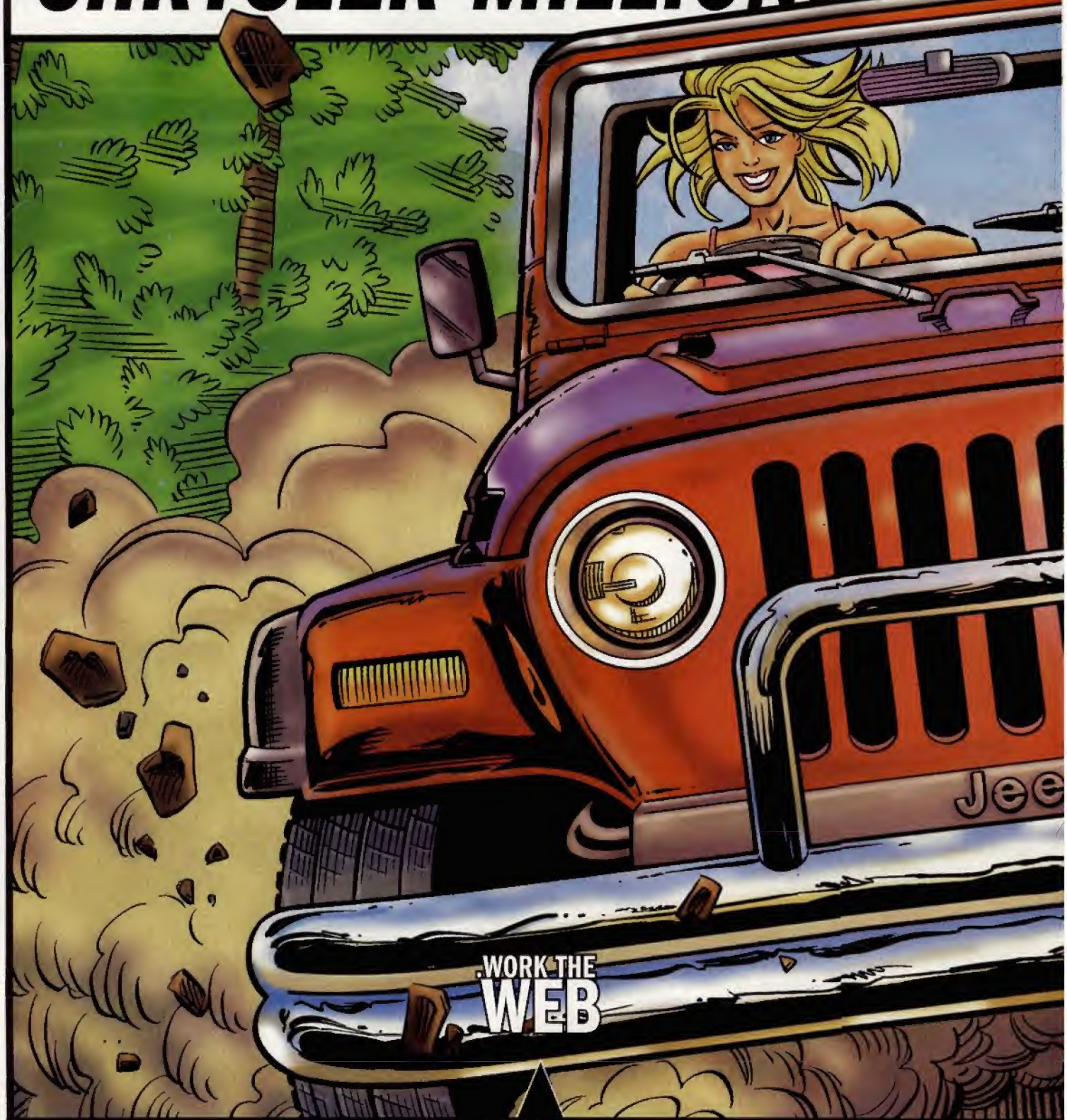
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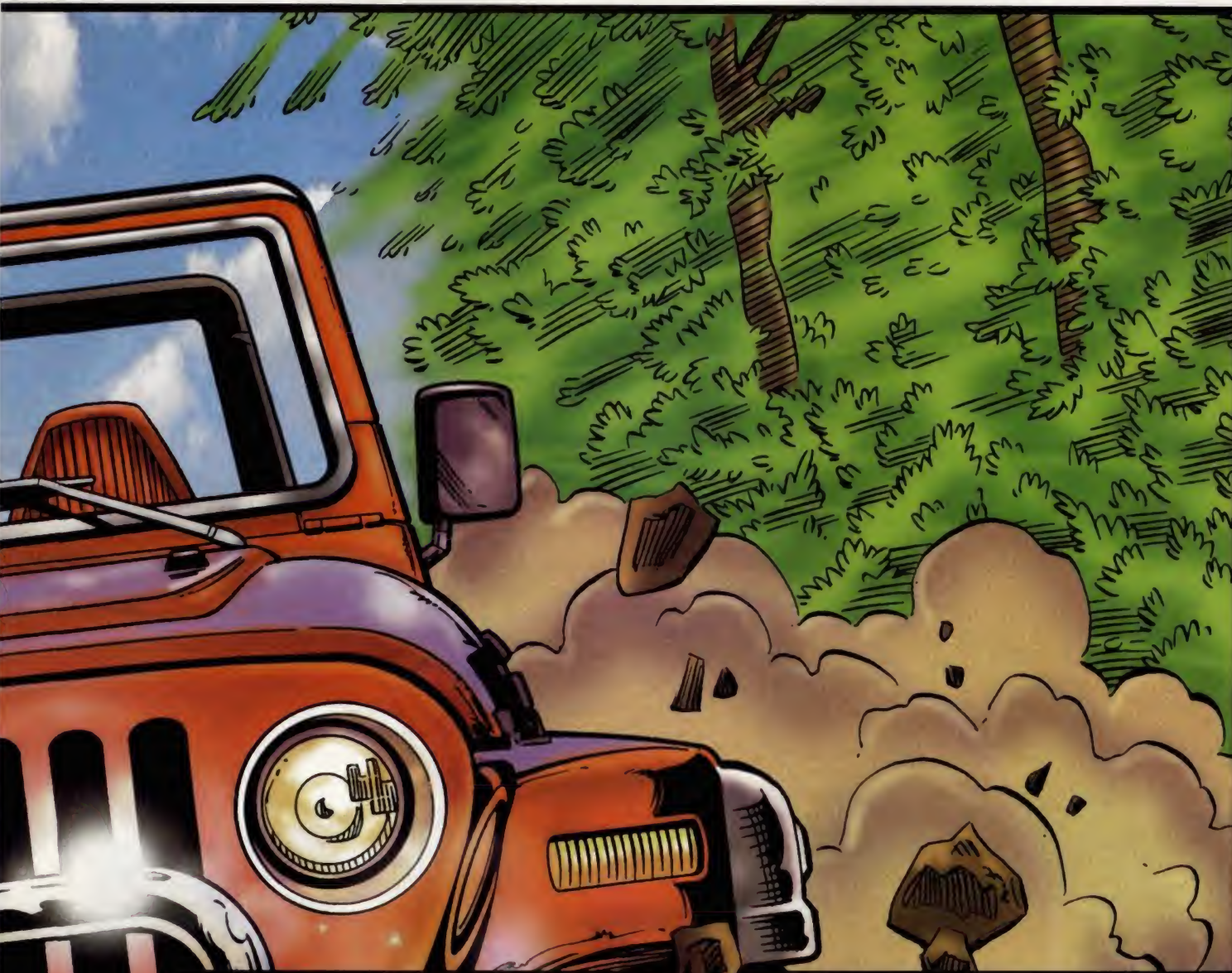
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### Internet extravaganza

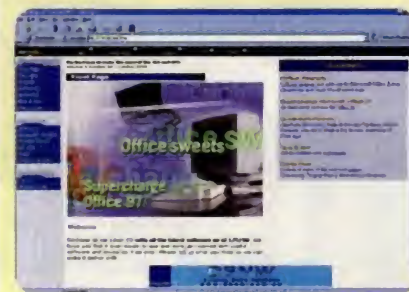
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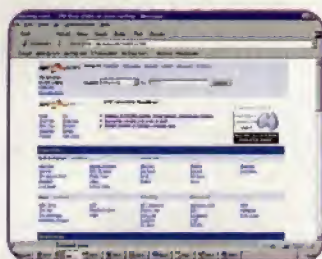
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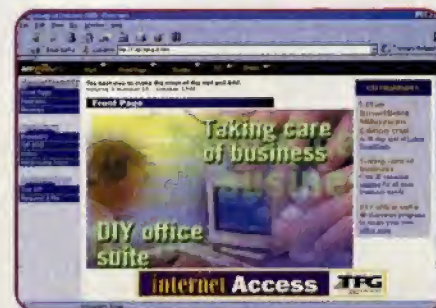
## NEW &amp; HOT

Search4, Sentry 98, Time On Line

## DISC 2

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## MIXED REACTION

## Net up, PCs down

While the use of PCs and associated technologies continues to grow, that pattern doesn't seem set to offset the local slump in PC sales, a trend which is being exacerbated by continuing problems for end users purchasing computers.

Australia's reputation as an embracer of new technology remains strong. Close to 1 million households in Australia now have Internet access, new figures from the Australian Bureau of Statistics (ABS) reveal.

Data from the ABS shows that the total number of home Net users rose 14% between February and May this year, to around 970,000. About 34% of computer users now have Net access, and most of the new growth came from households that already owned a PC, according to the ABS.

Shopping via the Internet is also on the rise: 409,000 adults made an online purchase in the 12 months to May 1998. A total of 1.1 million orders were recorded in the same period,

Continued on page 22

## SECURITY WOES AND SLOW ROLLOUTS

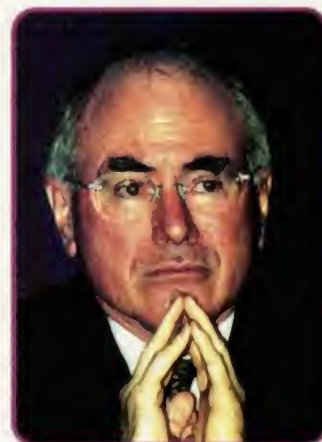
## IT cast aside by politics

**A**fter eagerly awaiting the release of the Government and Opposition tax packages, IT industry representatives appear disappointed with both of the major election alternatives, saying that while bits of both proposals are useful, neither on its own would create a sustainable and profitable high-tech industry in Australia. The ALP has missed an opportunity for reform, while the Government has ignored the need for investment incentives, according to prominent industry bodies.



Labor's tax proposals include measures to increase innovation investment, not only via increased R&D tax concessions for some, but also through encouraging venture capital investments in start-up and early-stage enterprises. It may find it difficult, however, to sell such initiatives in a package that many say is lacking in reform and vision in dealing with broader tax issues, such as the company tax rate and indirect taxation.

While the Coalition's package has offered the tax reform many have suggested, for some parts of the economy, it has ignored major business tax reform so far. It will announce a policy only after consultation with business. However, IT industry representatives said this consultation has already taken place and has been published in the form of many reports, and that it is crucial to act more quickly to reform the business sector. Legislation will be drafted after a report is released on this consultation at the end of March next year. Treasurer Peter Costello did suggest, however, that if business made



concessions in other areas, the company tax rate could be lowered to 30% and capital gains tax could be reduced. Business concessions could include an end to accelerated depreciation, as well as cuts to R&D benefits. The reduction of the concession to 125% has already resulted in a decrease in R&D spending.

The Coalition's tax reform proposal would see income tax rates reduced and a 10% GST introduced on virtually all goods and services. This would impact the price of hardware

Continued on page 22



From this month, APC is proud to launch a new addition to its stable of products: **APC NewsWire**. The first dedicated Australian technology news Web site, **NewsWire** provides a continuously updated, 100% local service that has been designed from the ground up to take advantage of the facilities of the Web.

Throughout each weekday, news stories are posted to the site as they happen. Unlike most IT news services online, **NewsWire** is written with the Australian technology user in mind. We also include extensive links to related articles and resources.

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AUSTRALIA'S TECHNOLOGY NEWS



## Feeling secure



Purchasers aren't the only people uncertain about ecommerce. A survey of 1,600 IT professionals across 50 countries by PricewaterhouseCoopers for *InformationWeek* found that 73% of firms represented had experienced some kind of

security breach in the previous year. However, 7% of firms selling through their Web site had experienced a security breach which led to lost revenue, while only 1% of firms which didn't sell via the Web had the same experience.



## Net up, PCs down

Continued from page 21

suggesting that repeat purchases are becoming more common. Of the adults surveyed, 20% made four or more purchases.

Of the orders placed online, 70% were with non-Australian firms, a substantial difference from similar figures released by APT Strategies earlier this year. That survey, across 650 regular Net shoppers, found that 96% had purchased goods from an Australian online store, while only 50% had purchased from US-based sites.

Of the purchases made online, 78% were also paid for online, reinforcing the notion that a substantial group of Australian users are still not content with Internet security. Similarly, only 1% of Australians had used the Net to pay bills, while 30% had paid bills over the telephone.

The latest figures come just three months after the last ABS survey into Internet trends. This represents something of a turnaround, as the ABS has been criticised in the past for delaying the release of technology-related figures.

The increased interest in the Internet hasn't, however, impacted on sales significantly. According to a preliminary report by International Data Corporation (IDC), PC shipments in the Asia-Pacific region in the second quarter of 1998 decreased 5% compared

to the same period in 1997 — but the worst is still to come.

PC shipments for Australia rose an encouraging 18.3% to 462,000, placing it in second position behind China. In terms of market share, Compaq continues to lead with 9.8%, followed by IBM on 8.4% and Hewlett-Packard on 5.5%.

While many of those companies are looking to the consumer market to maintain increased sales, caution is advised. Fifty-five percent of PC buyers experienced problems within two weeks of purchasing equipment, according to early findings from a NSW Government consumer inquiry into the PC industry.

Conducted by the Fair Trading Advisory Council (FTAC), the inquiry also found that over 30% of respondents never received goods paid for and that 57% of retailers which sold 'problem computers' were no longer trading, including Empire Systems, Fairstar, Forem-Freeway and ShopSure.

In early June this year, the FTAC asked PC buyers to call a hotline number and answer questions related to PC purchases. The inquiry received 425 responses, and 25 meetings were held with consumer bodies and key industry figures. A full report of the findings will be released in early October.

**Roulla Yiaccoumi and Angus Kidman**

## IT cast aside by politics

Continued from page 21

and software. As it is subject to varying rates of wholesale tax, the price of hardware would be expected to drop in many instances. The price of software, which is currently tax exempt, would increase 10% under the proposal.

Under the reform plan all IT services, including outsourcing services, Internet access, development and consulting work, would be subject to the 10% tax. The Government has said ISPs would still be able to be contacted with a local call and that although that price would not increase, overall costs for Net access would rise. IT workers, often on higher-than-average incomes, would benefit from lower income tax rates. There is no mention of how a GST would be collected on online transactions.

Exports will be GST-free, with exporters receiving credits on the GST paid on the inputs. The Government has estimated that the changes in the tax reform package, if accepted, would result in reduced costs to the sector of 4.9%, and make exporting more competitive.

Industry bodies are not convinced, however. The Australian Information Industry Association (AIIA) questioned the Government figures and the assumptions behind them.

While the Coalition's tax package focused on a GST and simplification of the business tax system, the ALP instead offers a 'fairer' personal income tax regime and limited reform to wholesale sales tax. Indirect taxation would stay because, said leader Kim Beazley, it exempts the necessities of life, such as food and shelter, from taxation, and does not hit the services sector, which it

believes will be the generator of future employment growth.

The ALP has promised to reinstate the 150% R&D concession to those companies with fewer than 500 employees which either submit a plan to the Industry Research and Development Board outlining R&D plans or are part of an industry that has a Strategic Action Plan with the government. Companies with more than 500 employees that spend at least 2.5% of their turnover on R&D would also be eligible. All other companies would be eligible for a 125% R&D concession.

It also said that foreign investment funds that invest through specified Approved Venture Capital Funds (AVCFs) would not be subject to capital gains tax. AVCFs would not have to pay capital gains tax on gains made on their approved investments. The system would be evaluated after three years. An ALP government would also broaden the number of projects eligible for infrastructure rebates to include electricity, water and alternative energy projects.

The ALP also plans to instigate yet another inquiry; a National Development Authority will look into ways to further develop the venture capital industry to grow Australian enterprise.

Another distinction between the parties is their stance on the outsourcing of government IT services. The ALP has said it will place a moratorium on the whole of government IT outsourcing program until its worth has been properly assessed. The Coalition has remained firm on its commitment to outsourcing.

**By Selina Mitchell**

**Page 27: Analysis: The election in which nobody wins**





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## PAY UP OR PERISH

## Tax office clampdown

**W**hile changes to the sales tax model remain a key political issue in the upcoming election, that hasn't stopped the Australian Taxation Office (ATO) from launching a new scheme to crack down on tax evasion.

Sales tax evasion is a widely recognised problem within the computer industry. Many smaller retailers maintain a cost advantage against larger players by evading tax. Assemblers of PC systems can purchase components free of tax, with the proviso that they include the tax in the final price charged to consumers. Many, however, have failed to collect sales tax and pass it on to the ATO.

From September 1, however, companies will only be able to purchase components tax free if they have ATO accreditation, which requires a demonstrated history of compliance with sales tax laws.

The problem is not a purely theoretical one. The ATO last month released details of a recent prosecution in which two individuals had evaded \$694,625 in sales tax. One of the two men was sentenced to 18 months' gaol, to be released after six months on a three-year good behaviour bond. The other was sen-

tenced to eight months' gaol, but was released immediately on a similar bond. "This case demonstrates that the courts see tax evasion as a serious crime," said assistant commissioner of taxation Michael Cebalo. Regardless of the changes, the ATO will continue to investigate known cases of evasion under the old system, he said.

The ATO has also released the final version of its ruling on the extent to which Y2K-related expenditure can be considered an ongoing business expense (and therefore directly tax deductible), as opposed to a capital improvement (see *APC* July, page 17). Y2K assessment, repair, and legal and insurance costs will all be deductible expenses for taxation purposes under the ruling.

However, changes made to software must not "result in what is, in essence, a complete replacement of the computer software", except as provided for the earlier budget announcements, and hardware may not be substantially changed. Where there is an overlap between software development work which is deemed to be capital in nature and revenue in nature, costs must be apportioned between the two areas.

Angus Kidman

## ISDN ROW

## Satellite proposal 'not the way to go'

**A** plan to use satellite technologies to deliver high-speed bandwidth to rural users has been dismissed by a leading technologist.

Last month, the Australian Communications Authority issued its findings on whether ISDN access should be made part of the universal service obligation which defines minimum telecommunications standards for all Australians. The group said that such a requirement would not be economically viable, and that planned satellite services from Telstra and others would be a more effective means of providing high bandwidth access.

The Government has not yet officially responded to the report, but criticisms have quickly been raised. "It's not a technology you can rely on in the next two to three years," said Judith Estrin, Cisco's chief technology officer and senior vice-president. "If you want to get bandwidth to the home, satellite is not the way to go," she said via videoconference at the Com Tech Open Systems Forum in Coolum, Qld.

Pricing of satellite services is an important consideration, Estrin noted. "One of the major risks with the satellite is not the technology, but



whether the companies in the market come up with the right business model," she said. Concerns have been raised that the satellite service will be too expensive for many rural consumers, and a coalition of industry bodies has recommended that the services would need to be subsidised.

Estrin said that a widespread rollout of ISDN was not the ideal solution either. "I would mandate DSL or cable before ISDN," she said.

This viewpoint was echoed by Cisco president and CEO John Chambers (pictured). "Very few of our customers think ISDN is the answer in the long term," he said.

Angus Kidman

Angus Kidman travelled to Coolum as a guest of Com Tech.



## News Roundup

As *APC* went to press, Microsoft and the US Department of Justice were due to finally face off in court over the ever-more-complex antitrust suit filed against the software giant. The proceedings are set for September 23, but a series of last-minute legal arguments threatened to delay the trial once more. Just prior to the trial, the DOJ revealed several new areas where it felt

Microsoft's actions demonstrated a pattern of anticompetitive behaviour, when it filed a motion opposing Microsoft's move to have the entire case dismissed. These include allegations of attempts to restrict participation in the multimedia market by Apple, RealNetworks and Intel. Microsoft filed a motion requesting that this evidence not be considered, saying that it would delay the trial and introduce unrelated issues. The DOJ filed a request for Microsoft to be compelled to provide a

range of new evidence, largely comprising correspondence between Microsoft executives and various outside firms. That request was granted.

The software market in the Asia-Pacific region may be in a serious slump, but there's one bright spot: demand for enterprise resource planning (ERP) products continues to soar. According to recently-released figures from IDC, the ASEAN market for ERP products (traditionally defined as integrated packages covering enterprise





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SW81501A



## TECHNO-THIEVES

# Crime time online

ften technologies are created without any thought for their potential illegitimate use. The technological developments which have taken place in recent years have provided novel opportunities for an extensive range of illegal acts, and many companies believe the trend is set to increase.

A recent Australian Institute of Criminology (AIC) report, *Criminal Exploitation of New Technologies*, notes that companies are most concerned about hacking or system intrusion, misuse of telecommunications services and the greater use of encryption.

The report said that illegal activities already taking place include illegal surveillance (not only listening devices and telephone interception technologies, but also the interception and collection of electromagnetic impulses generated by computers); Internet stalking and online sexual harassment; online money laundering; and the theft of funds transmitted electronically between banks, merchants and consumers via computer.

"Recent payment systems involving stored value 'smart' cards and electronic cash will be vulnerable to manipulation and fraud when security

measures are compromised electronically. Even the most sophisticated systems being devised for electronic commerce, such as digital signatures which make use of public key cryptography, may be compromised if private keys are stolen or other access controls circumvented," states the report.


It also notes that desktop publishing technologies enable users to scan and alter documents, providing extensive opportunities for counterfeiting and forgery as well as the creation of false identities. It noted a case in Victoria where an offender created 41 separate false identification documents (including driver's licences and birth certificates) and opened 42 bank accounts. "The offender was able to register a business name, make withdrawals from cheque accounts, obtain Medicare refunds and defraud various retailers," said the report.

"Understanding how the most sophisticated offenders are able to carry out their plans is, arguably, an essential first step in preventing technology-based crime from taking place. The expected benefits of new developments thus need to be balanced against any negative consequences which they might entail," says the report.

**Selina Mitchell**

## ECOMMERCE PUSH

# The search for authentication

ecure, ubiquitous ecommerce is getting closer following the proposal of a model for a digital signature National Authentication Authority (NAA) and Standards Australia's release of two draft standards for encryption and authentication.

The NAA proposal, a draft version of which was released in mid-August, would seek to reassure consumers of the veracity of digital certificates via quality labels, the support of industry-developed codes of practice and standards and through raising awareness of authentication techniques.

Several discussion papers, including those produced by the National Public Key Infrastructure Working Group and the Attorney-General's Expert Group on Electronic Commerce, have identified the need for a peak body charged with promoting and endorsing methods for electronically establishing identity.

Two models for electronically verifying identity via digital signatures or certificates are in use. The closed model, such as that used by the National Australian Bank and the NSW TAB, uses unique digital certificates issued by each

service provider. An alternative is the open model, which involves a single digital certificate that would be accepted by a wide range of service providers. Such a certificate would be issued by a general-purpose certification authority like Telstra or Australia Post, or a commercial organisation such as KPMG/Dun & Bradstreet, which has recently debuted its own service.

The Federal Government considers a closed model will prevail in the immediate future. The NAA proposals are the result of a search for a solution by the National Office of the Information Economy.

Also, Standards Australia has released two drafts of proposed standards: Draft DR 98410 for X.509 digital certificates and Certificate Revocation Lists; and DR 98411, which outlines standards and formats for hash, digital signature encryption and key exchange algorithms.

The drafts are considered an essential part of the NAA proposal and also of the Federal Government's Project Gatekeeper, which outlines strategies for the use of public key technology across government agencies.

**Josh Gliddon**



## News Roundup

tasks such as finance, human resources and manufacturing) was valued at \$US115.4 million for 1997. The research firm is predicting a compound annual growth rate of 28.4% over the next four years, leading to a market valuation of \$US313 million by 2002.

• A recent survey has found that over 80% of Australian organisations still see the Web as primarily a promotional resource. The

survey, conducted by Fluid Interactive Communication, investigated the attitudes towards the Web of 100 of *BRW's* top 1,000 companies. Over 60% of companies surveyed already had a site, but only 14% of those attributed an increase in revenue to a presence online. Twenty-nine percent indicated an increase in efficiency; and 20% of the companies surveyed said a Web presence had reduced business costs.

• Blast from the past: A Dutch startup plans to resurrect one of the most popular

home computers of the 1980s, the Commodore 64, and use it as the basis for a home Internet terminal. Web Computers International (WCI) has announced plans for a machine known as Web.it. Like the C64, it would be designed to plug into a standard television, and run programs written for the C64, but would also sport Windows 3.1 and a range of applications. For complete versions of these and many other stories, be sure to check into <http://newswire.com.au>.



*Election mode has bought lots of promises, but little vision for the IT industry.*

# The election in which nobody wins

**I**f only' seems to be the phrase most used by IT industry associations, professionals and companies in the lead-up to the federal election. Most agree that some of the policies from the major parties are useful and necessary, but they also agree that it is a case of too little and almost too late. There is also widespread frustration with the lack of consultation that is taking place.

Neither of the major parties has released a specific policy for IT. The Coalition has focused on selling its tax reform package, based on the introduction of a GST and personal income tax cuts, while the Australian Labor Party (ALP) has released an industry policy which includes changes to R&D and capital gains tax concessions (see story on page 21).

Australian Computer Society (ACS) chief executive Arthur Dyster said the IT industry had been forgotten, only being "trotted out" to show its national importance at convenient times. When decisions were made that impacted the industry, this was done without discussion with professional and industry associations.

The ACS has renewed its demands for a ministry devoted to IT policy and planning, instead of the current system where at least five ministers have some responsibility for the sector. "Nobody has their hand on the tiller and meanwhile the policy gets bounced around," said Dyster.

Alex Gosman, executive director of the Australian Electrical and Electronics Manufacturing Association (AEEMA), approved of parts of both packages. He said the AEEMA supported the ALP 150% R&D concession and venture capital initiatives, but was disappointed the package would not provide broad tax reform. The AEEMA supports the Federal Government's goods and services tax proposal, but was again disappointed that crucial business tax reform was "put off to never-never land" and that the proposal was not focused on incentives.

Dyster added it was difficult to compare the two packages, as one was providing reform and the other just tinkered with the existing tax system. While the Coalition is offering taxation reform and little direct investment incentive, the Opposition is offering a few incentives without

making necessary major changes to the taxation system, he said.

"Australia is currently faced with 30,000 IT job vacancies caused by a severe IT skills shortage amid growing demand from all industry sectors. This situation is also exacerbated by the drain of many of our skilled workers to positions in Europe, North America and Asia," Dyster said.

"The onus is squarely on government to provide funding for the creation of many more university places to help fill the breach and ensure Australia has the technical resources we need to compete in the global Information Age."

One independent analysis by Deloitte Touche Tohmatsu sees advantages in both taxation policies for IT, but also some

funds are certainly the major source of start-up capital for new technology companies, but it would have been good to see some incentives for domestic investment in our own technology being proposed." He added that the increased R&D concession will help high-technology companies, who are often dependent on research for their long-term survival. "What is not clear from the Labor Party's proposal is why middle-tier companies are excluded from the increased concession," he said. "Labor's decision not to impose a GST or make any significant changes to the wholesale sales tax regime will avoid the resource crunch that could arise from a GST commencing at the same time the Y2K problem is being tackled. System owners might welcome the relief. IT service providers are more likely to rue the large amount of potential work for-gone."

Deloitte analysts believe the Coalition Tax Reform Package provides mixed implications for the IT sector. IT contracting costs will remain high if a GST is introduced.

The GST may disadvantage retail software suppliers — at present software is not taxed. "A major concern is that retail software tends to be the type that can be easily acquired over the Internet. It

will be very difficult for the Government to apply a GST to Internet purchases where the supplier [is] based outside of Australia. Local retailers could be at a significant disadvantage until the taxation system catches up with electronic commerce."

However, software suppliers to the commercial sector should come out slightly ahead, said Deloitte analysts. "They will get some savings on their hardware costs and will generally be able to pass GST on to customers who can claim an input credit."

So what now? An election campaign is probably not the best time to introduce reform, noted one IT analyst, despite the need for speedy and drastic change. Concern will centre on voter reaction rather than future benefit, he said, so perhaps we will have to wait a little longer.

**Selina Mitchell**



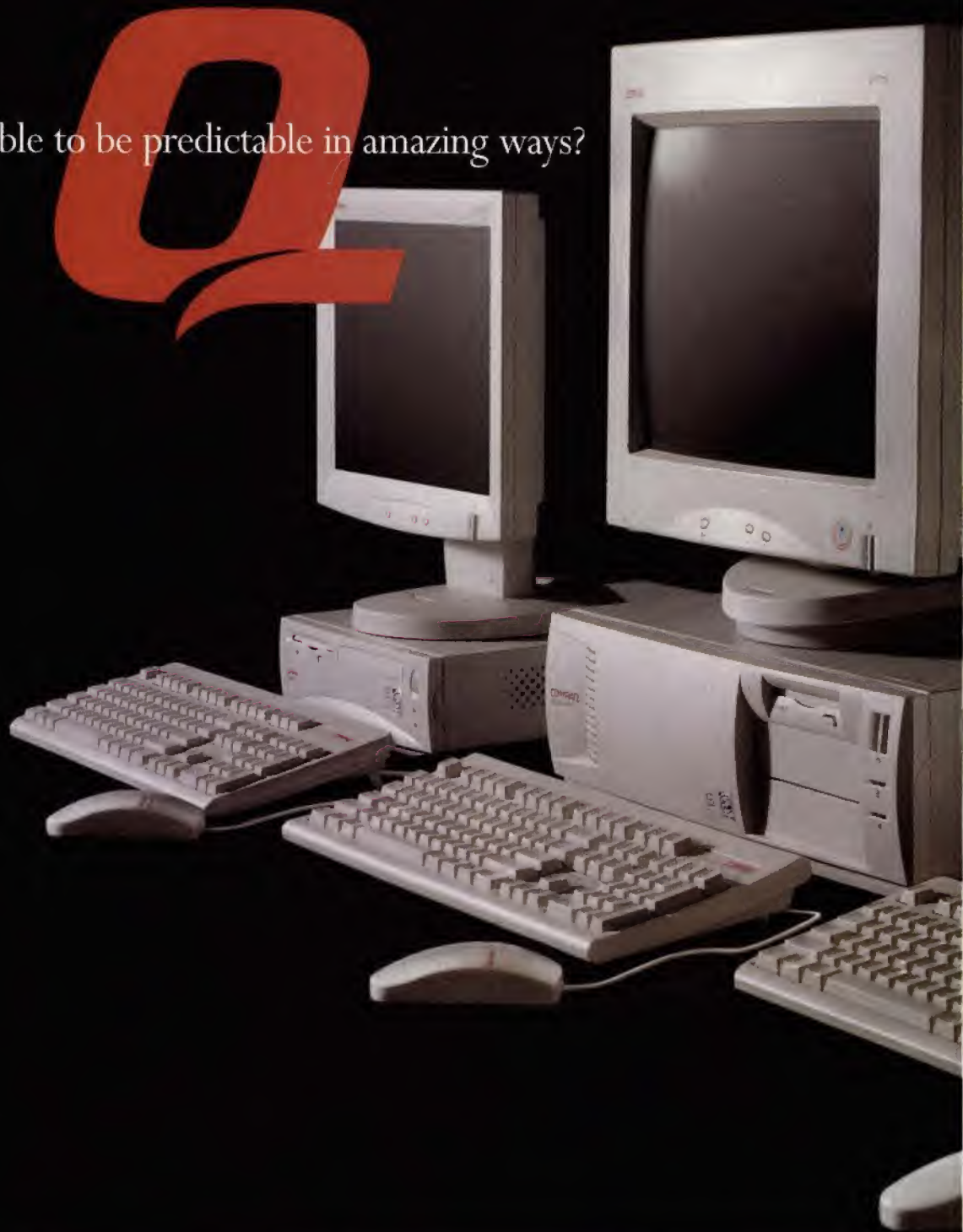
problems. "Whilst many in the business community might see Labor's tax package as falling far short of the tax reform required, it does contain some elements that will be of assistance to the technology sector," said Jim Morrison, a partner with Deloitte Tax Services.

He said the most significant proposal was the CGT exemption to attract foreign investment into technology companies in the early stages of their development. "This will remove one of the major obstacles to local developers getting access to offshore capital and hopefully prevent the need for many of them taking their technology out of Australia," he said. "Hopefully the approval criteria will not be so onerous as to stifle the incentive."

"The curious aspect of the proposal is its focus on foreign investors. US investment



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*Just what does it mean to XML-enable an application?*

# How XML is changing applications

**E**xtensible Markup Language (XML) is the latest Web technology to be hyped as a fool-proof path into the future; but just what does it mean to XML-enable an application?

After being fast-tracked to approval by the World Wide Web Consortium (W3C) in February this year, XML has been incorporated into a diverse range of products, from Inso's DynaBase publishing system to Microsoft's forthcoming Office 2000 suite. Research firm Ovum has predicted that XML will also cause a resurgence in electronic data interchange applications.

Interest in the technology continues to grow locally as well. "It's gone from a community where we personally know every single person by name, to large projects being undertaken by whole teams of programmers we've never heard of," said Allette Systems' Nick Carr.

Allette Systems is helping organise the SGML/XML Asia-Pacific Conference in mid-October 1998, and expects a substantial response, with double the number of last year's attendees. Key local users include the government-developed Business Entry Point, which uses XML for data exchange.

XML is derived from Standard Generalised Markup Language (SGML), a long-established standard for marking data structures within documents. Data is marked with a series of tags, similar to those used in HTML (except that the new tags can be defined by the user at any time).

Two key features make XML easier to deploy than SGML in a Web environment. Firstly, it removes some of the more complex and arcane aspects of SGML. Secondly, it makes the use of a document type definition (DTD) — an outline of the structure of a particular type of document — optional, allowing documents to be created and parsed on the fly by applications which understand XML structures. (For a more comprehensive overview of XML, see APC September 1997, page 113)

The practical upshot of all this is that XML allows data (whether for online delivery or not) to be easily tagged, searched and indexed. Like its distant cousin HTML, this can be used to format the output of a document; XML makes use of the develop-



ing Extensible Style Language (XSL) standard to describe how data marked with a particular tag should appear onscreen.

XML's status as one of this year's hot Web technologies has led to some companies jumping onto the bandwagon without an overall strategy. "The sophisticated applications are the ones coming up from SGML, rather than those that are coming down from HTML," said Carr. He also noted that the simplicity of using XML may have become exaggerated: "They think that it's going to be easy because it's different." Nonetheless, companies are beginning to use XML in more creative ways.

For Lava Systems, which develops software for enterprise document management, XML provided the ideal tool to allow users of its products to access information from a range of data sources.

The Lava approach uses an n-tier architecture with three basic layers, all of which utilise XML data. A 'repository adapter' is used to convert data from specific proprietary formats into an XML document. This is then passed to the Lava applications server, which renders the data for either Lava's proprietary client or viewing in any standard Web browser, using DTDs to format information consistently.

Lava vice-president of delivery and services Charles Latucca said that while the company actually began planning the

strategy before XML emerged as a standard, it was a natural fit. "XML is a nice format for us to communicate between applications, both our own and standard applications," he said.

One key advantage of XML's standardisation is that Lava can develop its own repository adapters for common applications (Exchange, SAP and JD Edwards are among the early candidates), but companies with more unusual configurations can also be catered for with custom adapters.

Tools for developing XML are also becoming more common. Last week, Object Design launched its XML Object Manager, which allows RDBMS development of XML applications for both clients and servers. "Server-side XML is going to become an increasingly important topic in the coming months as more companies realise that XML is not just about document data, but also application data," said NC.Focus president JP Morgenthal.

The XML standard has led to the usual bickering between Microsoft and Netscape over which company has a better implementation. Explorer's XML support predates the final version of the specification, meaning it has been on the market longer but may not incorporate recent changes. Netscape has only offered XML support since midway through this year, but the cross-platform appeal of XML and its browser products may make it a more natural fit.

Standards battles are also still being waged. The XSL specification has only just reached its first public draft, and some problems remain in its implementation. However, the importance of XSL shouldn't be overstated, said Carr. "Formatting languages [such as XSL] are fundamentally different from modelling languages [such as XML]," he told APC. With SGML, Rich Text Format (RTF) has often proved an easier solution for formatting, he said.

Microsoft and IBM have further muddied the waters with Document Content Description (DCD), a recent proposal to replace the document type definitions (DTDs) used by both XML and SGML with a new scheme, itself written in XML. The DCD proposal has been submitted to the W3C.

Angus Kidman





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Could the iMac be Apple's key to yet another comeback?

## Apple iMac

**F**or the best part of a decade Apple has been little more than a joke, moving erratically from model to model and from one marketing campaign to another, without giving new users a compelling reason to adopt the platform.

In the last 18 months the company has introduced a simplified model line-up and moved to increase the volume of software available for the platform. The next task in the great recovery — wooing back Apple's once-core education and consumer markets — will be up to the eye-catching iMac.

The iMac has a modular design based around components culled from the PowerBook line and the defunct Columbus set-top box program. Standard issue components include a 233MHz G3 processor with 512K level 2 cache, 32M of RAM, 4G hard drive and a 15in monitor capable of a flicker-free 120Hz refresh rate at 640 by 480. Also onboard are a 56K V.90 modem, a 10/100 Ethernet port and a 24x CD-ROM drive of the same type as that used in the PowerBook line.

There are four USB ports for peripheral connectivity — two on the keyboard and two in the flip-down connectivity bay on the right-hand side of the machine. The keyboard and mouse already account for two of these ports, although Apple is confident that USB's daisy-chain capabilities will encourage peripheral vendors to build extra ports into their devices. Few USB devices were available at press time, but the number is expected to increase towards the end of the year, paralleling an increase in PC USB availability.

Three issues confront anyone considering purchasing an iMac: software availability, speed, and the lack of a floppy drive. All three probably fuelled Apple's decision to not sell iMacs through mass-market retailers so as to avoid unfavourable comparisons by sales staff unfamiliar with Macs.

APC examined a feature-complete, pre-production version of the iMac, and benchmarked its performance using Ziff-Davis' MacBench 4.0. The problem with MacBench is that it benchmarks against



an older Power Macintosh, making it difficult to compare performance to a PC equivalent. In order to provide some parity, we conducted benchmarks of our inhouse Apple G3 notebook equipped with a 250MHz processor, also with 512K of back-side cache, a 4G hard disk drive and a 14in active matrix display.

The iMac recorded a score of 718 in the MacBench processor test and 576 in the floating point test. By comparison, an Apple PowerBook G3 with a 250MHz processor scored 865 for the processor test and 623 for floating point. Disc and graphics scores for iMac were 351 and 539 respectively, while the PowerBook, which also had a 4G hard disk drive and a 14in matrix screen, scored 264 and 575.

Apple prefers quoting ByteMark benchmarks, which shows the performance of the G3 processor used by the iMac in a favourable light against the 300MHz Pentium II. Reports from Ziff-Davis and CMP cast doubt on the iMac's real-world application performance, however, possibly because of low-quality subsystems used by the iMac.

Because there's no easy comparison between MacBench and PC scores, it's difficult to make assumptions about iMac's rated performance. In any case, the iMac is a fast machine, and its performance could be marginally improved by expanding the machine up to its 128M RAM limit.

Expanding the iMac's RAM quotient is a simple affair. Its logic board, hard drive and CD-ROM drive are an integrated unit that slides out of the bottom of the translucent case after three screws and two connectors have been unfastened. The RAM expansion module — again, the same part used in the G3 PowerBook line — can then be inserted and the whole unit slides back in.

Apple emphasises that this modularity also has advantages for businesses that have previously resisted all-in-one units: in the event of a monitor failure, the guts of the machine can quickly be transferred to another iMac case, minimising downtime.

Apple has not outlined an upgrade path for iMac, although it appears that the hard drive, a standard IDE unit, could easily be replaced with a greater capacity drive. No processor upgrades will be available, nor is it clear whether higher performance G3 processors, such as the 300MHz versions available in other Apple desktop machines, will be included in forthcoming iMac releases.

Of particular interest is the blanked-off panel in the connection bay on the iMac's right-hand side. It's approximately the size of two Type II PC Cards, and runs through to a connector on the iMac logic board. Apple representatives declined to state the purpose of the blank panel, but bearing in mind that the iMac won't accept conventional expansion cards, providing PC Card expansion seems like a sensible, if expensive, alternative.

The iMac's success depends largely on whether Apple can convince consumers to buy a computer that doesn't talk the same numbers as the rest of the computer industry. However, it is a compelling machine, from its radical design to its easy setup and its wonderfully clear monitor. It makes people want to touch it, but whether that initial buzz can translate into a long term consumer market revival remains to be seen.

Josh Gliddon

### Apple iMac

■ Distributor	Apple
■ Phone	1800 025 355
■ Online	<a href="http://www.apple.com.au/">http://www.apple.com.au/</a>
■ Price	\$2,695
■ In short	A good performer that may be let down by an elitist approach to resellers.





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*If you were looking at getting a Pentium II system at around the 300MHz to 333MHz mark, it might be a good idea to look instead at the new 'Mendocino' Celeron systems.*

# Dell Dimension XPS Celeron

**A**lthough the industry was largely underwhelmed when Intel initially launched its low-cost Celeron processor, two new models look like they will make up for Intel's earlier mistakes.

The original Celerons were without level 2 cache, which made their performance less than appealing. The new processors, the 300A and the 333MHz models, however, incorporate a 128K integrated level 2 cache. As an added bonus, the level 2 cache, which is incorporated into the main die, runs at the full clock speed of the processor, rather than half, as is the case with the Pentium II.

This cache-fiddling has led to an interesting situation: the new Celeron has a faster cache, and the Pentium II has a larger cache. This means that some applications will actually run faster on the lower cost Celeron than on the Pentium II, while others will run faster on a Pentium II of the same clock speed, because they make use of the larger cache.

The 300A and 333MHz Celerons also mark the introduction of a new motherboard slot type — a small socket. It's not Socket 7 or Socket 8 compatible, but unique

to the Celeron. The new processors will also continue to be sold in Slot-1 packages (as was the case with the machine we looked at) to OEMs requesting that configuration.

From our benchmarks, it appears that Intel may have actually beaten its own Pentium II processors with the new 333MHz Celeron. Testing a Dell Dimension V with the new processor demonstrated levels of performance that were considerably better than a number of 300MHz and 333MHz Pentium IIs we have looked at in the last few months. In Ziff-Davis' Winstone 98 1.0 benchmark, the Dimension scored 24.23, which compares well to the 23.1 achieved on a 300MHz Pentium II Beyond Computers system. Intel's major competitor in Celeron's market, AMD, may also have something to worry about, despite its advantages over the new Celeron due to its 3DNow instructions. When we tested it several months ago, AMD's 300MHz K6-2 scored 24.1 Winstones.

The Dell Dimension V we tested also has other things going for it. The performance of its 32x CD-ROM and the speed of the 6.4G Maxtor IDE hard disk when tested with Ziff-



Davis WinBench 98 was impressive. The performance of the ATI Rage Pro Turbo graphics chips was also decent. The Dimension V is otherwise a very well-integrated machine. It's not very modular, but it is well put together, and both networking and video functions are embedded on the motherboard. A 17in monitor is also supplied with the system, but it does not come with a soundcard by default (one can be purchased at additional cost, however).

There are now only higher clock speeds to differentiate the higher-margin Pentium II from the cheaper Celeron processors. As AMD recently pushed closer to Pentium II clock speeds with its K6-2, Intel is going to find it hard to maintain the distinction.

The wash-up? If you're looking at buying a Pentium II at a clock speed for which there is an equivalent Celeron processor, you could save a few dollars by buying a Celeron system, like the Dell Dimension V333c. The performance trade-off is minimal but the cost advantage is significant. For instance, you can find the 333MHz Celeron for a street price of \$523 as compared to \$787 for the 333MHz Pentium II (Harris Technology). The full Dell Dimension V system will set you back \$2,459.

**Nathan Taylor**

## Specifications and results

### Product

Processor	<b>Dell Dimension XPS V333c</b> Intel 333MHz Celeron
Level 2 cache	128K
RAM/type	64M SDRAM
Monitor	17in
Hard disk drive	6.4G Maxtor 90640D4
Hard disk controller	Intel 82371AB/EB PCI Bus Master IDE Controller
Hard disk file system	FAT32
Video bus type	AGP
Video adapter	ATI Rage Pro Turbo
Video RAM size	8M
Video RAM type	SDRAM
Video controller chip	ATI
Graphics driver name and date	macxw4.drv (4.10.01.2436)
CD-ROM drive speed	32x
CD-ROM drive model	NEC CD-ROM drive:28C
Operating system (bundled)	Windows 98
Extras	Embedded Fast Ethernet chip

### Benchmark results

Business Winstone 98	24.23
CD-ROM WinMark 98 (K per second)	1,746.67
CPUmark32	672.33
Business Disk WinMark 98 (K per second)	1,423.33
High-End Disk WinMark 98 (K per second)	3,996.67
Business Graphics WinMark 98	150.67
High-End Graphics WinMark 98	181.00

All products used in these tests are shipping versions available to the public at the time of publication, unless otherwise stated. The above specifications refer to the actual machines tested by APC Labs. Check with the vendor for the latest components. Winstone, WinBench and associated programs are registered trademarks of Ziff-Davis Inc.

## Dell Dimension XPS

■ Distributor	Dell
■ Phone	1300 303 107
■ Online	<a href="http://www.dell.com.au/">http://www.dell.com.au/</a>
■ Price	\$2,459
■ In short	A very good alternative to Pentium II systems.





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**SONY.**



*A portable audio player with a difference:  
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# MPMan

**A**n MP3 is a sound file encoded using the MPEG audio layer-3 compression algorithm. Using MPEG as a standard allows for reasonably good sound quality — not up to CD standard, but probably better than an average analog cassette. And tracks don't take up much room; the average file size is around 3M, depending on length.

Furthermore, software to create and play MP3s is widely available online, although some of these 'rippers' (as the software used to extract material from CDs is called) and the associated players are of inferior quality.

Until now, MP3s have only been playable on PCs. MPMan, a cigarette-pack-sized portable MP3 player, changes that by making MP3 truly mobile. At the same time it poses a significant challenge to copyright owners, such as record companies, which have thus far shied away from distributing soft versions of their products. The reason for this is that MP3 lacks serial copy management, making it simple to make multiple copies from a single digital source.

An MPMan is available with three memory options: 16M, 32M and 64M, upgradable via flash memory cards. APC tested the 32M version, which can store around 11 three-minute songs; this capacity is just under half of the 72-minute capacity of standard audio CD.

The MPMan comes with rippers, an MP3 player for Windows 95 and the MPMan management utility on a CD-ROM. Also included in the package is a well-illustrated manual that clearly outlines everything the MP3 neophyte needs to know to get up and running.

Installing the management utility crashed the test machine (a Digital Venturis Pentium 90 with 32M of RAM running Windows 98) at the conclusion of the installation routine. Interestingly, the application was present and worked without any apparent problems after the machine had been rebooted.

Converting a song to MP3 format with the ripper and installing it into the MPMan is a simple task. This is accomplished by placing the MPMan into its included cradle (which also doubles as a recharger for its NiMH batteries), locating

the MP3 file on the PC's hard drive using the MPMan management utility, and then instructing the application to transfer the file. Transferring a 3M file takes about 20 seconds.

The MPMan is simple to use, with controls limited to play, stop, review and cue. There's also an info button that displays the amount of memory available and the number of tracks in memory via a small, non-backlit LCD display. Unlike rival formats such as Sony's MiniDisc, the



MPMan, and the MP3 format, has no provision for the entry of track titles or the names of track performers. The final control, a slider positioned on the side of the unit, allows selection from three different bass boost levels.

APC also tested several commonly available rippers alongside the one shipped with the MPMan, and it became apparent that the sound quality output by an MPMan was very dependent on the quality of this software. For the record, the included version provided the best sound quality. Playback quality, using files created with the included tools, was good, although there was a slight metallic buzz and an odd *trompe l'oeil* effect that gives an illusion of musical depth. Using Koss headphones (which were of superior quality to the supplied earphones) quickly revealed the limitations of MP3 playback, and the illusory depth was revealed for what it was — a compressed approximation of the original high-quality CD source.

The MPMan has one drawback associated with its all-solid-state construction: once the 32M (or 64M) is filled, there's no way of changing storage on the fly. An MPMan would be a very poor alternative to any other portable sound format on long journeys for this very reason. Upping internal storage to a minimum of 128M, and preferably 256M, would be a partial solution, but one that's not currently feasible for cost reasons. The MPMan's NiMH batteries may also pose a problem on the

road because the cradle is needed to recharge them. There's no way that regular rechargeable batteries or standard AA size batteries can be used as substitutes, so if power dies halfway across the Pacific, or on a long bus ride, that's it.

On the positive side, an MPMan won't be affected by vibration and it is very light, making it a perfect for joggers or others who want music while they exercise. Battery life of around eight hours means you would probably get bored of the

music selection before the batteries run out of life.

The MPMan points the direction to the future of portable music. Its drawbacks are low-quality reproduction and limited storage capacity; the positives are lightness, robustness and solid battery life. It also presents a challenge to record companies, which will have to grapple with the threat posed by MP3 to their property rights.

Josh Gliddon

## MPMan

■ Distributor	Chaos Multimedia
■ Phone	(02) 9281 3640
■ Online	<a href="http://www.mpmman.com/">http://www.mpmman.com/</a>
■ Price	\$599 for 32M version
■ In short	Interesting, but a minidisc player/recorder would be a better choice for those looking to throw away their analog cassettes.





**Crash.**



**Boom.**

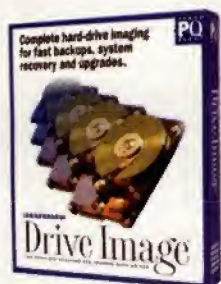


**Bang.**



**Click.**

**Now restoring your hard drive is as easy as blowing it up.**



Your hard drive blew up. You lost everything. You had your whole life contained in a few Gigs. Which is why it's a good thing you used Drive Image™ from PowerQuest®. In minutes, you were able to make a complete backup of your hard drive. When disaster struck, you simply reloaded

**Fast.** With SmartSector™ technology, Drive Image can now create a compressed image of your hard drive significantly faster than traditional backup methods.

**Safe.** Drive Image now features ImageShield™ password protection and encryption to protect critical information. It also automatically checks disk integrity and looks for bad sectors to prevent data loss from occurring.

the copy of your hard drive and you were back in business. No hassles. No missing preferences, partitions or passwords. No problems. Just a click of a button and your computer was restored to its exact state before the crash. It's that simple.

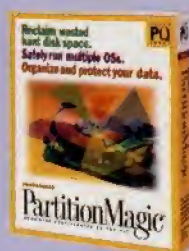
**Easy.** A user-friendly interface makes it easy to manage your saved files. And a step-by-step wizard simplifies the backup process.

**Flexible.** You can quickly restore your whole hard drive or recover individually selected files. Drive Image also allows you to "span" across removable media, such as Zip®, JAZ®, and SyQuest® drives.

Now, restoring your hard drive is as easy as clicking a button.

**Version 2.0 now available!**

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David Jones • Software Express • 03.96636580 • Harris Technology 02.99571142

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U.S. Patents 5,675,769 and 5,706,472. Other patents pending.

PQ182K3-1

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**PQ**  
**QUEST**



*A great tool for making smooth and professional-looking brochures and documents.*

# Corel Print Office

**C**orel Print Office is a publishing and graphics package, complete with basic address book and calendar functions. It is aimed at small business and home users, but would be just as useful to the armies of people in big companies who still need to easily create attractive documents.

Print Office emphasises ease of use rather than raw power, and quickly achieves excellent results. The suite has three separate modules that work closely together. The main module is a desktop publishing program also named Print Office. The second, Photo House, is a bit-mapped drawing package for photo editing, drawing and image manipulation. And finally, Colleagues & Contacts is a calendar and address book program. The package also includes a huge collection of fonts, clip art, photos, templates and theme sets spread over three CD-ROMs. All are shown as thumbnails in the manual.

Open any of the three modules and an important feature is immediately obvious — a dockable 'Notebook', which provides access to guides and wizards, similar to those in Microsoft Office. To the right of the Notebook is the editing area, and above



are menu bars and toolbars. An additional toolbar is conveniently located between the Notebook and the editing area. Need more area to edit a project? Double-click on the Notebook and it changes to a small floating window, and the editing area expands to take up the additional space.

When the Print Office module is first started, the New Project page of the Notebook is displayed, with four options: From Sample, From Scratch, Open Existing, and Open Last.

Click on From Sample, and a list of eight possible categories, appears, including banners, business theme sets, calendars, and cards. Choose one of these and another list appears. In the case of business theme sets it is a list of 61 categories, from architectural to sunsets. Select a theme, and a list of eight document types appears including brochures, business cards, invoices and letterheads. Print Office uses a grid and rulers to assist in aligning objects on a page, but lacks the column guides found in most desktop publishing packages.

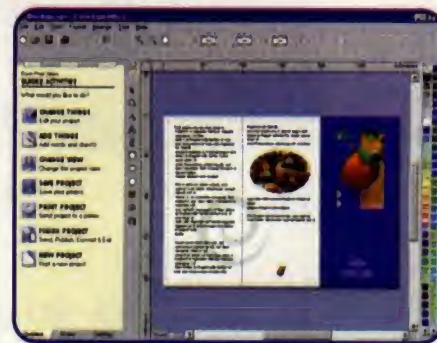
Clicking on From Scratch starts a similar process that is used to design a blank document with the right layout for your project. Once the basic document is on the desktop it's possible to add images, draw directly onto the page, and add tables. Text is added either as a graphic object which can be distorted and manipulated, or as paragraph frames which can be linked to flow text from frame to frame. A mail merge facility uses data in lists within the Colleagues & Contacts address book.

Colleagues & Contacts' main screen displays the calendar for the current month, and buttons allowing scrolling forwards and backwards by month and year. Relevant public and religious holidays can be displayed or hidden. It can be used to record appointments and other reminders. These can be for single or repeat events. A reminder can be given in advance, with the default being the previous day. Reminders are displayed as soon as the computer starts, with no need to start the program.

Mail merging using Colleagues & Contacts can be of all entries in the address book, or several sublists can be easily created and used as the source for a merge. Colleagues & Contacts is not a competitor for advanced contact managers like Act, but it still has enough power for most users.

Images and text can be imported into a document from many sources, including the CDs in the package. Available images are displayed as thumbnails in the Notebook, making selection of the right image very easy. Before adding an image, Photo House can be used to edit it.

Photo House is a bitmap editor for photos and scanned images. It can be used to change brightness, contrast and colour intensity, repair scratches and red-eye,



crop images, add effects such as vignette or fog, and add a fade to image edges.

There are dozens of effects, including softening or sharpening an image, embossing, and posterising. The drawing tools include fill, spray paint and pencil tools with preset and user-defined widths, transparencies and effects.

Photo House offers rectangular and freeform selection of areas. Unfortunately, there is no 'magic' selection tool to automatically outline an object. You can manipulate selected areas from one image, or copy and paste into another image.

Print Office's recommended minimum system configuration is a 486 DX2/66 with 16M of RAM. We used a 486 DX4/100 with 32M of RAM and a Pentium 233 MMX with 64M of RAM for this review. Performance on the Pentium was excellent, however, when using the 486 it was just acceptable.

Overall, Print Office is a very attractive package with excellent features. The real strength of the package comes from the Notebook, templates and themes, and also the fonts, clip art and photos are invaluable.

**John Hepworth**

## Corel Print Office

Distributor	Corel
Phone	1800 658 850
Online	<a href="http://www.corel.com.au/">http://www.corel.com.au/</a>
Price	\$139
In short	Excellent templates, photos and clip art. The Notebook wizards plus DTP and photo edit modules make it a very useful, productive package.



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**GOOD OLD DAYS**

*can be* **BETTER**  
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*A look at the first 450MHz Pentium II we could get our hands on.*

# Gateway G6-450XL

**T**hroughout this year processor releases from Intel have progressed in a steady march — from the 333MHz Pentium II all the way to the 450MHz Pentium II. The 66MHz front-side bus motherboard architecture has leaped to the 100MHz bus, but what hasn't been seen much is both these features in a system designed for PC gamers. If you are one of the growing breed that thinks a PC's main purpose is for playing games, then the Gateway G6-450XL is the machine for you.

Gateway obviously had a good think about what a serious gamer would want in a system and then supplied it. According to Gateway, the G6-450XL has been designed as the "ultimate gamer's machine" and when you look at what it packs, you can see why. This is the first of a new breed of 450MHz Pentium II powered machines APC will be looking at, and if the G6-450XL is any indication, good things are on the way.

Like all Gateway machines, the plugs are colour-coded and it is easy to set up. Our first impression of the system was that

there just didn't seem to be enough drive bays. This standard system comes fitted with the following drives: a super-floppy LS120, a 3.5in floppy, a 32x DVD-ROM and a CD-RW. This leaves only one 5.25in bay vacant. The LS120 can read both 3.5in floppy disks and its own disks, making the floppy drive superfluous.

The LS120 disks can store 120M each and the system comes with two blanks, but it would be a long time before you filled the 14.4G IBM hard drive and needed to dig for the disks.

The system is not only powered by a 450MHz Pentium II on a BX motherboard, it is also supported by a whopping 128M of RAM, twice the 64M standard configuration for a gaming system. As can be expected, a modem is supplied, although Gateway has favoured an external modem this time over its usual internal modem.

To the gamer, screen size and graphics are extremely important, especially for 3D. The G6-450XL has a 19in monitor and an ATI 3D Rage Pro AGP graphics card



with 8M of RAM. The card is for 2D rendering and can handle full-screen graphics and video with ease. It doesn't come with any utilities of its own, but you'll find the media applications in the pre-installed Windows 98 OS are more than enough. For 3D processing oomph, the system includes a 12M STB Blackmagic 3Dfx Voodoo2 card.

The G6-450XL's audio doesn't fall short either. The Creative Labs PCI64 soundcard and Boston Acoustics speaker setup have to be heard to be believed. The speaker set comprises a sub-woofer and two satellite speakers and have bass, treble and volume controls.

When we tested the system with our standard test suite, we found it to be a little disappointing in some regards. We tested the CD capabilities of both the DVD-ROM and the CD-RW drives and they were both below par. It also rated below average in the High-End Graphics WinMark, but in the other tests performed very well.

As a gaming machine, you would be hard pressed to find a system that beats this one. Overall, the system has an incredible configuration and took our breath away when we ran Unreal, Moto Racer and Quake II on it. It has been a long time since I've seen a group of nerds so flustered.

**Darren Ellis**

## Specifications and results

### Product

Processor  
Level 2 cache  
RAM/type  
Monitor  
Hard disk drive  
Hard disk controller  
Hard disk file system  
Video bus type  
Video adapter  
Video RAM size  
Video RAM type  
Video controller chip  
Graphics driver name and date  
CD-ROM drive speed  
CD-ROM drive model  
Operating system (bundled)  
Extras

### Gateway G6-450XL

Intel 450MHz Pentium II  
512K  
128M SDRAM  
19in VX 900  
14.4G IBM Ultra ATA  
Intel 82371AB/EB PCI Bus Master IDE Controller  
FAT32  
AGP  
ATI 3D Rage Pro/STB Blackmagic  
8M/12M  
SGRAM  
ATI Rage Pro/3Dfx Voodoo2  
macxw4.drv (4.10.01.2278)  
24x  
Toshiba DVD-ROM SD-M1102  
Windows 98  
LS-120 drive, CD+RW, 56K modem

### Benchmark results

Business Winstone 98  
CD-ROM WinMark 98 (K/sec)  
CPUMark32  
Business Disk WinMark 98 (K/sec)  
High-End Disk WinMark 98 (K/sec)  
Business Graphics WinMark 98  
High-End Graphics WinMark 98

29.80  
891.00  
1,106.67  
1,830.00  
5,103.33  
195.67  
233.67

All products used in these tests are shipping versions available to the public at the time of publication, unless otherwise stated. The above specifications refer to the actual machines tested by APC Labs. Check with the vendor for the latest components. Winstone, WinBench and associated programs are registered trademarks of Ziff-Davis. These tests were performed without independent verification by Ziff-Davis, and Ziff-Davis makes no representations as to the results.

## Gateway G6-450XL

- **Distributor** Gateway
- **Phone** 1800 500 734
- **Online** <http://www.gw2k.com.au/>
- **Price** \$6,599
- **In short** The best games PC you can get at the moment, but the price is high.





## Canon's patented new LIDE technology helps these new scanners break the price/quality barrier.

*Reinvent* is the most over used word in the computer business. But this time it's true. Canon has just reinvented scanners.

And not a little bit, but completely.

**Introducing LIDE.™** Using a new, patented technology called LIDE (LED Indirect Exposure), we have fundamentally changed the way scanners work, and their price/performance ratio.

LIDE eliminates the need for costly, complex optical mirrors in image acquisition, while it maintains superior image quality and colour clarity.

**Easy to use.** At the same time, LIDE allowed us to design a smaller, sleeker scanner with an exceptional combination of beginner and expert controls, and with easy to connect (daisy chain) parallel port connections for Windows® 95/98 and NT 4.0.

The new CanoScan™ FB 320P and FB 620P offer a choice

of 300 or 600 dpi optical resolution, plus enhanced resolution up to 2400 dpi\* and 30-bit colour acquisition as standard.

**Full software suite.** Both come with everything needed to begin scanning immediately. The CanoCraft CS-P

software works for both stand-alone image acquisition, and as a TWAIN driver for other applications. It features new, easier to use controls, and advanced controls for colour matching and image definition. Also included are PhotoExpress for image

editing and OmniPage LE for OCR, a CD-ROM with full tutorial and user's manual, a parallel cable and power supply.

**Canon Customer Care.** The FB 320P/620P scanners feature a one-year warranty upgradeable to three years for minimal cost, and are backed by unlimited hot-line support.

The new CanoScan FB 320P and FB 620P. You can see they are different at first glance. To learn more call 1 800 021 167.



**FB 320P – \$259<sup>RRP</sup> and FB 620P – \$399<sup>RRP</sup>**

# Canon



# Canon BJC-50

**T**he Canon BJC-50 is small. It has a footprint the size of a sheet of A4 paper folded lengthways, it's under 5cm high and weighs in at a paltry 900g, including the lithium ion battery. For slipping into your briefcase along with your notebook, it's pretty damn good. The works of the printer (ink cartridge and feed mechanism) hide at the back of the unit, and utilise what appears to be a mechanism almost identical to that of the BJC-80. Paper feed and connections are very different, however, due to the printer's tiny size. Paper can't be stacked on the underside of the lid as with the BJC-80. It has to be fed one sheet at a time through the front of the casing.

Similarly, there was no room on the back panel for the data connector, so it has been relocated onto the side using a subminiature socket. A special cable is supplied to link this to the standard parallel socket on your notebook. The battery is a long, thin item which clips under the three-button control panel, just above the paper feed slot.

It has some clever design touches, like the power switch lock to prevent accidental switch-ons, and the option to snap out the



print head and replace it with an optical reader head. This can then scan in documents using an ordinary parallel connection. The cable link is also complemented by an IrDA port, so for those with IrDA equipped notebooks, cableless printing is a viable alternative. The printer comes supplied with a spare three-colour and black ink cartridge, which is useful because they are pretty tiny — Canon claims about 40 pages per refill. A special black-only tank lasts for about 150 to 200 pages.

Powering up (and shutting down too) takes a while, but once ready, the BJC-50 is surprisingly brisk. A full page of very dense text only took about 20 seconds to print, and even with a few graphs and images added it took just 35 seconds. Canon claims 5ppm,

which is probably about right for repeat pages. Colour wasn't so rapid; a page of graphics took more than twice as long to print, just under one minute in standard mode. Try a photo-quality image and you'll not only empty the cartridges pretty fast, but have over four minutes of thumb-twiddling. Image quality was good, but not up to Epson's benchmark Stylus quality. Some streaking was noticed on dense tones, even on photo-quality paper, and a few jaggies were evident on extended smooth curves. However, nothing that comes close to this unit's portability.

Jeremy Torr

## Canon BJC-50

■ Distributor	Canon
■ Phone	(02) 9805 2000
■ Online	<a href="http://www.canon.com.au/">http://www.canon.com.au/</a>
■ Price	\$699 (image head \$149)
■ In short	Very flexible, highly portable and as compact as they get. For on-the-road input/output, no competition.

# Funnel Web 2.02

**W**eb servers generate gigabytes of priceless customer intelligence, but few organisations understand what works on their site — and what stinks. For Webmasters who aren't already capturing the feedback at their fingertips, a new log file analysis application from Melbourne-based Active Concepts is worth a look.

Funnel Web 2.02 can quickly transform meaningless numbers into information that reveals how visitors interact with your site.

A simplistic five-button user interface belies Funnel Web's power. The Settings button is the application's key: here you set out what information you hope to extract from the raw log data. Funnel Web compiles statistical tables and colour graphs showing server load on daily, hourly, weekly and monthly bases. More importantly, it helps track what directories and files are most popular. A tabbed interface allows Webmasters to select what information to report.

Funnel Web handles all major HTTP server log formats, including Apache, IIS, Netscape, Domino and WebSTAR. Logs can be uncompressed or gzipped; PKZip

support is expected in future. The Windows version can load logs via FTP, and this capability will become cross-platform with Mac OS 8.5's Navigation Services.

Log processing is fast and furious. A 13M uncompressed IIS log was processed in two minutes on a 133MHz PowerBook. As memory is allocated on the fly, logs over 80M will tend to push Funnel Web's scalability, but given enough memory it should handle up to 2G.

Reports are generated as a collection of HTML pages and GIF graphs. Only the master report opens directly in the browser, so other pages must be called up through it. This inflexibility seems unnecessary, but the quality of Funnel Web's reports cannot be questioned. Each page contains a visual representation and tabulates the underlying statistics. The colour-coded graphs are clean and easy to follow.

Funnel Web also tracks where users come from, their OS and browser platforms, what's downloaded, referring sites and even the search terms used to find your site. The professional version allows Webmasters to track click-streams to follow where each user went and how long they

stayed. Funnel Web Pro can operate on live logs and supports virtual domains as well as proxy, firewall and router records.

Post-processing options allow automatic gzip or Stuffit compression of log data and reports, and both sets of files can be uploaded via FTP while an email notification is sent. Unfortunately, Funnel Web won't delete the uncompressed files and the FTP client lacks configurability. However, AppleScript or NT Services automation can help deliver essential information with minimal fuss.

Dan Tebbutt

## Funnel Web 2.02

■ Distributor	Conexus
■ Phone	(02) 9975 2799
■ Online	<a href="http://www.activeconcepts.com.au">http://www.activeconcepts.com.au</a> (an evaluation version is on <b>apcmag.cd</b> )
■ Price	standard \$375; professional \$750
■ In short	A worthy application to help Webmasters track site usage.



It is no mean feat to make Australia's most popular printer for home and small offices better than ever. But that's just what we've done with the new BJC™-255SP.

Use 75% less ink. Super Economy mode reduces ink consumption by 75% compared to Standard mode, and works for both black and white and colour. Combined with a high capacity, black ink cartridge, it can print up to 2400 pages in black and white, and up to 600 in colour using standard inks\*. That's anywhere from two to five times the output of any direct competitor!

Fast B&W plus photo quality printing. Then, there is a choice of high-speed B&W, or three colour print modes – Normal, Fine and Photo. Photo mode emphasises highlights and contrasts, and improves half-tones by producing a richer process black.



Brilliant colour, super economy, optional PhotoRealism, improved Internet printing,

# all for just \$199.

**Optional PhotoRealism™** To this Canon adds the option of PhotoRealism inks, for photographic reproduction approaching silver halide quality. By layering inks in up to four densities, it produces up to four times the colour combinations of conventional CMY printers, for smoother colour gradations and more accurate colours in skin tones and other light shades.

**Better Internet images.** Image Optimisation takes low resolution Internet images (typically 72 dpi), and prints them at the highest resolution supported by the printer to reduce jagged edges and pixelisation.

**Canon Customer Care.** All Canon printers feature a one-year warranty, upgradeable to three years for minimal cost, and are backed by Customer Care hot-line support. Drivers are available for Windows® 3.1x/95 and Windows NT.



For all this, there's one thing we haven't changed, the price. It's still a low, low \$199 RRP. For more information call 1 800 021 167.



**BJC-255SP colour Bubble Jet™ printer – \$199<sup>RRP</sup>**

## Canon

\* Based on 5% page coverage, Super Economy not available with PhotoRealism inks. Price shown is the recommended retail price including tax. Canon and the Canon logo are registered trademarks and BJC, Bubble Jet and PhotoRealism are trademarks of Canon Inc. Windows is a trademark of Microsoft Corp. in the U.S. and other countries. Canon Australia Pty Ltd ACN 005 002 951

CS/5263





### The Gadget File

Just when you thought it wasn't possible for the size of casings to diminish any further, IBM has launched a stunner into the subminiature market. Since digital camera manufacturers widely adopted the CompactFlash standard as the memory format of choice, most cameras have been straining at the leash when it comes to adequate storage space. Putting more than a few megapixel images on one solid-state flash RAM card has meant forking out big bucks for a 10M to 20M sliver of silicon. Now IBM's rotating media experts have worked their magic and squeezed a hard drive into a CompactFlash card envelope. Measuring about 0.3cm thick and smaller than half the size of a standard

credit card or PC Card, the new drives are being launched with an initial capacity of 450M. According to Kevin Clark of IBM's Mobile Computing Group, big demand for these devices is also likely to come from the new wave of Windows CE devices also using the CompactFlash memory standard, as the current drain demands are much less than bigger drives now being used.

Sony has entered the convergence market in a big way with the launch of its latest semiprofessional DV camcorder, the TRV-900. The camera is a fairly standard three-chip DV format tape device with still and video capture facilities, but the outstanding feature is its output option range. It comes with the usual row of output sockets to connect to FireWire, VCR, TV and so on, and also an

additional Type II PC Card slot on the back panel. Sony also supplies the TRV-900 with a card to go in the slot which is connected directly to a standard 1.4M floppy drive (also supplied). This allows direct-to-floppy capture of any recorded still or video frame, in JPEG format, ready to read on any PC. The other neat feature of this more-than-passing nod towards the computer world is that Sony's recently developed Stick Memory format will be able to use the slot. This will offer the ability to store short video or multiple still images in ultrafast access flash RAM, cheaper and faster than almost any other medium, and in a format which is totally transparent across conventional video as well as PCs or Macs.

Jeremy Torr

## Panasonic KX-PS8000

The Panasonic KX-PS8000 is a network-capable colour laser printer. It comes with a flatbed colour scanner, which is connected to the printer via a SCSI cable and can be locked in place on top of the printer. So you get a colour printer, scanner and copier all in the one unit.

This printer's output is very impressive. Print quality on our test prints was excellent; clean sharp edges, good solid colours, and photos were close to photographic quality. A professionally printed glossy magazine cover scanned on the KX-PS8000 produced excellent colour matches in the printout, including metallic and skin tones. And we printed on plain paper.

The only major difference between the original and the scan were visible dots on skin tones and yellow. This could have been improved if we printed at the maximum resolution of 1,200 by 1,200dpi, which is only possible if you add more RAM to the printer than the standard 16M it ships with. If no extra RAM is added the maximum print resolution is 600dpi. There are two extra SIMM slots which take up to 32M each, so the printer can house a total of 80M of RAM. The duplicating utility shipped with the unit could also be used to rectify the mottling effect in skin tones. This program allows for onscreen colour corrections and enhancements.

The scanner's maximum resolution is 9,600dpi, although only with the use of

software. It's as easy to use as any office photocopier. To make a colour copy you just place the item face down on the scanner, select colour or black-and-white, and then choose glossy or plain paper. Hit copy and out it comes. It's pretty quick, taking about one and a half minutes for a full A4 colour page.

Panasonic claims the KX-PS8000 has print speeds of 3.5 pages per minute (ppm) for colour, and 14ppm for black-and-white (at 600 by 600dpi). Printing times for 1,200 by 1,200dpi are twice as long.

If you purchase the additional trays it has a total paper capacity of 850 sheets. It can print on most media including transparencies; laser envelopes and labels; legal, letter and A4-sized paper; and heavy card stock. The cartridges are high-capacity so you won't need to change them often; colour cartridges are good for 10,000 prints, while the black toner has a 12,000 print capacity.

The printer is designed to be as maintenance free as possible, so components and consumables are quick and easy to change. Paper jams were not uncommon, but no laser printer is jam-free. We also encountered several error messages in testing, such as low toner warnings. As it was uncertain if the cartridges were new when we received the printer, this may or may not have been the case. Print output



did not deteriorate despite continued printing.

Overall, setup was standard fare, although it was initially complicated by the fact that we received no documentation with the printer. Despite this we got it working very quickly.

Claire Waddell

#### Panasonic KX-PS8000

■ Distributor	Panasonic
■ Phone	132 600
■ Online	<a href="http://www.panasonic.com.au/">http://www.panasonic.com.au/</a>
■ Price	\$18,200
■ In short	Great vibrant colour printing, with a scanner to boot.



# Better colour, Super Economy, fast blacks, PhotoRealism and optional scanner, the BJC-4310SP does it all.



It can cut ink consumption by 75%, be used as a scanner, improve printed images down-loaded from the Internet, or even print banners. And this is in addition to better colour for plain paper, PhotoRealism inks for the gold standard in photo quality printing, plus super fast B&W!

**Better operating economy.** Super Economy mode reduces ink consumption by 75% compared to Standard mode, and works in both black and white and colour. It can print up to 3600 pages in black and white, and up to 400 in colour!

**Better on plain paper.** Another feature is Canon's Drop Modulation Technology with dual drop sizes for smoother colour gradations. It is designed to produce better looking colour on plain paper, which also helps keep operating costs down.

**The PhotoRealism gold standard.** When quality is most important, there is the option of Canon PhotoRealism inks. They vary

the saturation per pixel so that a single dot could have 0%, 33%, 67% or 100%. This produces up to five times as many colour combinations as conventional CMYK inks, with better half-tones and almost no visible grain, even in areas of low colour density.

**High speed blacks.** A high-speed black ink cartridge with 128 print nozzles is included with your purchase. It is capable of speeds up to 510 characters per second (4.5PPM)?

**It's even a scanner.** The optional IS-22 scan head allows you to turn your printer into a colour scanner in seconds. It scans colour images up to 360 dpi and offers high speed B&W scanning for fax, OCR and copying functions!

**Canon Customer Care.** All Canon printers feature a one-year warranty, upgradeable to three years for minimal cost, and are backed by unlimited hot-line support.

The BJC™-4310SP. Everything you could ask for in a printer, and a little more. For more information call us on 1 800 021 167.



**BJC-4310SP colour Bubble Jet™ printer – \$299<sup>RRP</sup>**

**Canon**

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## Comparing notes

Richard Walsh's 'Disconnecting with the Net' [APC, July 98] left me somewhat disturbed. It so happened that, at the time of reading the article, I was awaiting the delivery of my carefully ordered Dell computer. After reading of Mr Walsh's experiences, I must say I had doubts as to whether I had made the right decision in choosing Dell. These doubts magnified, when, due to both an influx of orders coinciding with the end of financial year and problems configuring Dell computers with Windows 98, I was informed that my computer would be two weeks late. In addition, my order was temporarily mismanaged by Dell staff, resulting in a few frantic phone calls and a considerable degree of stress. It seemed that I, too, was in the process of 'disconnecting with the Net'.

That, I am glad to say, is the bad news. The good news is that Dell profusely apologised for mis-handling my order and, importantly, was more than willing to compensate me for my troubles. The result was a \$700 refund on my order, and the delivery of an excellent computer system. Though I am no expert, I had the computer up and running and connected to the Net in less than half an hour. Since then I have experienced no problems whatsoever.

In short, no computer outlet is perfect. Dell, however, are clearly prepared to address any problems, if and when they arise. In addition, I have found them to be professional, polite, and capable of deliver-

ing a high-quality product. Mr Walsh's article is one person's experience with Dell. I have given you another.

**Marionne Noud**  
Internet

## Viva la revolution

Congratulations APC on your excellent September issue! Finally a mainstream computing magazine has had the foresight to devote some decent space to Linux. Not only were the editorial and feature articles well thought out and presented, but the CD-ROM was an absolute knockout! Providing large packages such as KDE, Enlightenment and Kernel source can only increase sales of your magazine among the Linux community.

So c'mon APC. Be bold, be brave, take the lead and devote 100M or so each month to the latest kernel sources and other 'bandwidth busters' such as Star Office and WordPerfect.

Do it now while your competitors remain oblivious to the magnitude of the Linux revolution!

**Adrian Casey**  
Internet



## Competition winner

The winner of the Windows 98 competition in the August edition of APC was David Northcote of Cumberland Park, SA. He wins a Windows 98 prize pack.

## Recall

**Disc 1 in the Top of the Pops CD-ROM set distributed with the August 1998 issue of APC contained a desktop theme produced by a third party entitled 'Sydney 2000'. The Sydney Organising Committee for the Olympics (SOCOG) has notified us that certain images in that theme are its exclusive property and are not to be used without its permission. Accordingly, you should delete the Sydney 2000 theme from the hard drive of your PC and return Disc 1 to APC at the address on page 201. If you return the disc, we will send you a replacement without the Sydney 2000 theme.**

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# the Windows 98 pocketbook

The Windows 98 PocketBook is your complete service guide to installing, tuning and running Windows 98. Why waste time and money with overweight, overpriced tomes? The Windows 98 PocketBook has everything you need and nothing you don't. Plus! it comes with a great bonus CD packed with the best shareware and Net tools for the 98 user.

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**Canon BJC-80**  
\$399<sup>RRP</sup>



**Canon BJC-50**  
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Advanced colour, cable-less communications, optional scanner plus two sizes that are

# Small and smaller!

Canon has a wonderfully new idea for people that need a portable printer. A choice.

On the small side there is the BJC™-80. It is a fraction of the size of a briefcase. Yet, with its in-built sheet

## Drop Modulation Technology.

feeder and power adaptor included as standard, it is designed for people who have to produce high volume output from a very small printer.

Conversely, if size is critical, there is the brand new BJC-50 with in-built battery. It's not just small, at approximately half the size of the BJC-80 it's absolutely tiny.

Equally impressive, their performance is as big as their size is small.

Using Canon's advanced Drop Modulation Technology™ you can print everything from colour charts, to high quality photographs. Or, in seconds you can convert to extra high-speed black and white for finished business documents using the dedicated black cartridge with 128 print nozzles!



The BJC-80 fits in approximately half the space of a briefcase. The BJC-50 is approaching 50% smaller still.

## Optional colour scanner.

For greater portability, both models include an infra-red port for totally cable-less communications with any suitably equipped Windows® 95 notebook or PC.

And, if you really need the functionality of an office in the space of a briefcase, both models will accept an optional colour scanner head in place of the print

## Cable-less communication.

head. It takes only seconds to change the heads. You can then use the scanner head to acquire colour images, or for fax and OCR functions.\*

**Canon Customer Care.** All Canon printers feature a one-year warranty, upgradeable to three years for minimal cost, and are backed by Customer Care hot-line support. Drivers are available for DOS, Windows

3.1x/95 and Windows NT.

If you need help choosing between small, and smaller, give us a call on 1 800 021 167.

**Canon portable colour Bubble Jet™ printers**

**Canon**





## On the threshold

*Seems madam? Nay, it is. I know not 'seems'. — Hamlet*

**By Helen Dancer**

**P**erception is everything. Ask whether Australia has a viable role as part of Asia, and the answer is usually yes, I guess so, there doesn't seem to be any reason why not.

Ask whether it makes sense to choose as trading partners those nations on our doorstep rather than those on the other side of the planet and again the answer is yes, I guess so, seems like a good idea.

Ask Australians doing business in Asia what role Australia can play in the region, and the answer is not so straightforward. From atop the tallest tower in Singapore, you can see the coastline of Malaysia, from Hong Kong airport it's a hop, skip or jump in either direction. But for Sydneysiders it's a seven-hour flight. For us, no big deal, compared with the exigencies of the overnight flight to LA, or even worse, the whole-day trip to the east coast of America or to London.

Our historical trading partners are literally a world away, which makes our perception shrink, and we see Asia as a close neighbour. Australians were always good at travelling, we say, born with backpacks attached, water-bottle in hand. But if we could see ourselves from an Asian point of view, the picture might be very different.

At the Brisbane PC IT 98 exhibition in May there was a real vibe in the air, a sense that Brisbane had a future as a centre of technology excellence and as a portal for technology companies from around the world, particularly from ASEAN nations. The Office of the Premier had made technology partnerships a priority, and had allocated considerable sums of money to creating an attractive investment climate for technology.

Then came the Queensland election. In the aftermath, one of the single most

important statements was not from either side of politics, but from the Taiwan Australia Association, which pronounced that the new political climate meant that Taiwanese companies would think twice before investing in Queensland.

Queensland premier Peter Beattie recently made a visit to Hong Kong to assure the business community that One Nation was not in power in Queensland, and in fact formed no part of the state government. The fact that news came as a surprise to many reinforced the reality that trade relationships can be ruined by what *seems*, rather than what *is*.

It's not as if it isn't difficult enough already. Fairly healthy trade surpluses between Australia and several of the countries in the region in the March quarter

ism industry noted a 15.4% drop in arrivals from Japan in the month of July, the country that is Australia's single biggest source of tourists.

While the Japanese are not coming to visit because of a lack of cash, and the Koreans are not coming because to spend your money outside cash-poor Korea is considered unpatriotic, the news that the Taiwanese are not coming, to visit or to trade, not because they can't afford to but because they feel unwelcome, is bad news indeed.

In the March quarter, Australia maintained a trade surplus with Taiwan of \$279 million, and a surplus with Singapore of \$126 million. Both of these nations represent significant opportunity for Australia in the areas of technology and intellectual property exchange, not to mention

### Trade relationships can be ruined by what seems, rather than what is.

have declined in the succeeding quarter, due mostly to the ongoing currency crisis across the region. According to the ABS, the June quarter showed a total ASEAN trade deficit of \$300 million, an increase of \$9 million over the March quarter.

The gloomy news comes mostly from the hardest hit nations. Australia has lost significantly in exports to Indonesia, Vietnam and Thailand, and even to the more resilient Malaysia. This stands to reason: local currency devaluations mean they can no longer afford to buy what we have to offer, and conversely their goods are far more attractive in Australian dollars.

Australia will also suffer in terms of lost tourist revenue as Japan's economy continues to founder, and there is still no sign of substantial political reform. The tour-

an outstanding market opportunity for our own technology, particularly telecommunications and software. In the article on Asia's silicon valleys in this issue (page 64) Singapore business consultant Thomas Ng issues a timely reminder that the Asian region as a whole represents a potential market of 500 million customers. Matthias Goertz from law firm Booz Allen & Hamilton reaffirms the value of information exchange in the pursuit of product excellence.

Two good reasons to make sure that we get our messages straight, that we are what we seem, and we seem what we are. I believe we are not, as a nation, culturally intolerant nor hysterically xenophobic, but it's about time we remedy the chasm between what is and what seems.■



# Only Canon offers a way to acquire and print images in colour with a printer and scanner in one!

Canon has a unique solution to a question that has often plagued colour printer users. How do you get the image in, so you can output it to your Canon colour Bubble Jet™ printer?

**Only from Canon.** It is an optional scanner head that fits right into your printer, and it is available on several models for just \$149<sup>RRP</sup>

It takes only seconds to replace the print head with the scanner head. This then allows you to acquire images for storage, editing, manipulation, placement on the Internet, or even OCR and faxing, with the right software.

**Easy to use.** To get you started, Canon includes image acquisition and editing software with your scanner head purchase at no extra cost! And using it, you can scan full colour or 256 grey-scale images in resolution up to 360 dpi. Or you can use high-speed

mode if you simply want Black and White at 90 dpi, supported by most fax software.

Best of all, Canon offers a full range of models with this remarkable functionality. They are the BJC™-50 and BJC-80 portable printers, the BJC-4300 and BJC-4650!

**Canon Customer Care.** All Canon printers feature a one-year warranty, upgradeable to three years for minimal cost, and are backed by Customer Care hot-line support. Printer drivers are available for DOS, Windows® 3.1x/95 and Windows NT.

If you would like to learn more about how to get your printer to input as well as output, call us on 1 800 021 167.



The BJC-4300 with PhotoRealism.



The portable BJC-80.



The even smaller, portable BJC-50.



The BJC-4650 for Windows and Macintosh and sizes to A3.\*

**Optional scanhead – just \$149<sup>RRP</sup>**

## Canon

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## Niche media and the Net

*Where is the Internet heading?  
How long can it stay the flavour  
of the month? Will it all just  
disappear?*

**By Jeremy Horey**

**N**o, the Internet won't die. But it will become just another form of media. It will take its place alongside print, radio and TV as another way for people to find information and entertainment.

Although the Internet has a long way to go before it reaches this point, it already fits the pattern Paul Levinson identified for the evolution of media in *Soft Edge: A natural history and future of the information revolution*.

"All media eventually become more human in their performance — that is, they facilitate communication that is increasingly like the ways that humans process information 'naturally', or prior to the advent of given media. Voices on the telephone replace the dots and dashes of telegraph; colour photography replaces black-and-white; and the fluid online written dialogue, more like speech in some respects than print, now is beginning to compete with older, paper media."

Reports from the US indicate a decline in TV watching as Net use grows. Apparently, the number of hours of TV watched per week are dropping, while the number of hours spent using the Internet are increasing.

I haven't seen any similar statistics for Australia. The results of the latest Roy Morgan research on our media habits reveal we all still watch TV every week, or at least 94.6% of us do. This figure has decreased by just 0.1% from last year. This does not tell us whether people are watching fewer hours per week. It's unlikely that a clear picture would emerge for Australia anyway, as we have the growth in the number of people watching cable TV to complicate things.

What is interesting from this latest survey is the changing patterns in magazine readership. There is a decline in the numbers of people who read the big-selling titles like *Women's Weekly*, *Wom-*

*an's Day* and *New Idea*, while more specialist titles like *APC* are gaining readership.

In fact, more magazines overall were read this year than last year. But is there any connection between the Internet and the changes in magazine readership? There is no direct connection, except that both the Internet and niche magazine titles deliver more directed content.

The Internet is a niche medium. It is very good at delivering specialised content to a small group of users. It is not much good at delivering any particular site to a large number of users. The Internet starts to break down when very large numbers of users all want to access the

terises paper publishing, and radio and TV broadcasting. The Internet is another step towards a more human form of communication. It is 'one to a few' communication, or in some cases 'one to one' communication.

From time to time, people want to force the Internet to fit models drawn from other media. We have come through the era of push publishing almost unscathed. Push technology disappeared into a niche on the Internet, and now it's out of everybody else's way.

But just as we are almost free of one attempt to turn the Internet into a broadcasting medium, we have portals being peddled as the next big thing. We are told,

### **The Internet is another step towards a more human form of communication.**

same information. While sites like the official Olympics sites do an extraordinary job of delivering information to millions of visitors, they do strain resources. You need lots of computers and lots of bandwidth to support a site that's getting millions of visitors in an hour.

Compare this to the TV coverage of the Olympics. For the people producing the coverage, it doesn't matter how many people are watching. Once they have put it on the satellite it can be shown to billions of TV viewers without having any effect on the production crews or any of their facilities.

The magazine readership pattern is part of a trend away from mass media. It is part of a move towards more personalised services, more personalised goods and more personalised information.

To take up Paul Levinson's argument, the Internet is getting away from the 'one to many' communication that charac-

in spite of a complete lack of evidence, that there is only room for five main portals on the Internet in the US. It's another attempt to turn the Internet into TV, but this time there are only going to be five channels. Can we divide Internet users into five main types? People are not so homogeneous that they will put up with five gateways when there could be hundreds of thousands.

Portals are important, but don't believe big is beautiful in this business. Big may have lots of marketing dollars, but marketing dollars only buy one or two hits per customer. What keeps them coming back is content that is interesting, useful and easily accessible.

It is the logic of the medium and the trend in consumer preferences that are driving the move towards customisation and specialisation.

.....  
**You can reach Jeremy Horey at  
jeremyh@techtalk.com.au.**





# The PowerShot A5 is more than a digital camera, it's a Canon, which is why it's so small, so simple, so superior.

In a recent article Digital Camera said,

**"For features, quality of output and price this little digi snapper should sweep the scene.**

**Pick it up...it's tiny. Put it in your pocket...it disappears. Shoot with it...it's a dream."**

Here's why.

**Smallest in its class.** The PowerShot™ A5 combines advancements in lens technology, micro-circuitry and digital image processing.

The result is a camera that is the smallest in its class, with full automation for beginners and the performance for advanced photographic needs.

The 810,000 pixel resolution is high enough to produce exceptional photo quality prints in standard size!

**35 mm camera performance.** Canon has cut the times between operations common to digital cameras by up to 80%. This greatly assists auto focus, auto and programmable exposure and colour correction. Viewing on the revolutionary polycrystalline TFT

LCD screen offers exceptional image detail and a wide angle with reduced distortion in the 5 cm display.

More advanced users will find TTL monitoring, a breakthrough aspherical lens, an advanced range of aperture, shutter and colour controls including a colour mosaic filter, white balance and 30-bit signal input.

**Focal length – 5 mm (equivalent to 35mm for 35 mm camera).**

**Industry standard memory – Stores up to 66 images using 8MB CF card supplied.**

**LCD viewfinder.**



**Serial port – For PC and Macintosh connections.**

**Full software suite.** It also has one of the most complete software packages imaginable to let Windows® 95/98/NT4.0 and Macintosh® users begin enjoying the benefits immediately.

**Canon Customer Care.** The PowerShot A5 features a one-year warranty upgradeable to three years for minimal cost, and is backed by unlimited hot-line support.

But then, what else would you expect from Canon? To learn more about our range of digital cameras call 1 800 021 167.



**PowerShot A5 digital camera – \$1299<sup>RRP</sup>**

# Canon





## Small is beautiful

*Japan's dedication to tiny technology is motivated by an appreciation of simplicity and utility in design.*

**By Bruce McCabe**

**W**ithout a doubt, small is both beautiful and valuable, and nowhere is this more true than in the world of technology, where miniaturisation is an essential prerequisite for performance in key components such as microprocessors, hard-disk drives and DRAM chips. Freeing up desktop 'real estate' is becoming more important to both computer users and company accountants, making the small 'footprint' a much sought after attribute of all personal computers, printers and monitors. Of all products in the IT industry, however, small size seems to be most appreciated in mobile PCs, where every millimetre in size, and every gram in weight, is keenly felt by the aeroplane travellers hauling them around in their cabin baggage.

If the notebook is the product, then Japan is the country where size counts most. The Japanese have led the charge to miniaturise everything from digital watches to cameras (most recently of the digital variety), televisions and stereos (remember when the Sony Walkman created a whole new industry?).

Notebooks, subnotebooks and other mobile PCs happen to be an excellent example of the relationship between Japan and small technology. In Japan, well over one-third of all new PCs sold are of the mobile variety. The most successful manufacturer of mobile PCs in the world is a Japanese company: Toshiba.

Why is it that the Japanese are such dedicated producers, and consumers, of small technology? The popular answer is that miniaturisation was born of necessity. It is easy to see the truth in this when one considers that Japan has a population of 126 million living on 375,000km<sup>2</sup> of land (336 people per square kilometre). Australia, by

comparison, has 18.6 million people living on 7,618,000 km<sup>2</sup> (2.4 people per square kilometre). The need for space can be seen everywhere, and every time I visit I never cease to be impressed. A bus trip from Narita airport to the centre of Tokyo is an awe-inspiring tour of a concrete city that seems to go on forever. Being politely but forcefully slotted into an impossibly crowded carriage by specially trained white-gloved workers is unique to say the least.

Seeing a family manage to live happily in a one or two-room apartment — by eschewing large possessions, rolling up their beds every morning and making the best possible use of every cupboard, drawer and sliding panel — is amazing. Apart from real estate prices, one of the best indications of the value of space in Japan can be seen in the massive land reclamation projects that have been going on for decades. By dumping billions of tonnes of earth and concrete off the coastlines, and into the odd lake, Japan has been able to manufacture its own space for airports, docks and all types of industry. Recently I read that the Japanese were employing the latest engineering techniques to make space in another direction, extending their cities underground by up to 400 metres.

Personally, I think a lack of space is only part of the answer. The other explanation for this love affair with small technology lies deeper within Japanese culture. Many indicators can be seen in traditional Japanese arts, which embody simplicity in line and form. No pebble strays from a path through a traditional Japanese garden; every fold has a place in origami; calligraphy is executed flawlessly on wood, paper or cloth; and the most valuable paintings are executed in only a

few carefully placed strokes of black ink, rather than being embellished with many colours. Minimalism is displayed exquisitely in bonsai, the art of nurturing and displaying miniature trees. All of these characteristics were defined many centuries before Japan's population swelled to fill the land mass.

Art seems to spill over into science and engineering in Japan, and industry is strongly influenced by both the need to make things small, and a real appreciation by consumers of minimalism and utility in design. Even when there is no practical application, 'cuteness' will often make a new product sell unbelievably well in Japan. The Tamagotchi fad was not an isolated phenomenon — it just happened to be one the rest of the world noticed.

We can rely on the Japanese to continue leading the way with the miniaturisation of everything electronic. Companies like Toshiba, Sony, Mitsubishi, Fujitsu, Canon, Hitachi, NEC and Sharp all compete fiercely to set new standards in slim notebook designs, pushing weights down towards 1kg, and thickness through the 3cm and 2cm barriers. It's a sure bet an even thinner benchmark will be set the day after one of these companies finds a way. Not content with just making notebooks lighter and thinner, many of these manufacturers are now going to the trouble of building these machines with metal alloy cases, complete with smooth polished finishes — any IT exec in this country would kill for one. Yes, if small is beautiful, the Japanese are undoubtedly the greatest artists of all.

Bruce McCabe is senior industry analyst with Gartner Group. He can be contacted at [bruce.mccabe@gartner.com](mailto:bruce.mccabe@gartner.com).





# The bible of the printer industry described the BJC-7000 as “absolutely breathtaking.”

Hard Copy Observer is arguably the most authoritative publication in the printer industry. In August 1997 they said this about the BJC™-7000:

- "...The BJC-7000 cartridges offer new capabilities never before seen in a desktop inkjet printer..."
- "...including a unique new technology for pre-coating plain paper (P-POP) and support for seven colour printing..."
- "...the result is a brighter, sharper image, and also a more durable one..."

We couldn't have said it better ourselves.

**"7-colour process."** Only PhotoRealism™ inks on the BJC-7000 use a 7-colour process with conventional CMY inks, lower density CMY inks, plus black. The result is a unique Canon process. The inks can be layered in up to nine saturation levels per colour, per pixel ... to produce up to 90 times the colour combinations of traditional inks. As a result colours have finer gradations without banding and lines, and even hard to produce light shades are exceptionally free of pixelisation.

**Better plain paper performance.** P-POP™ (Plain

Paper Optimised Printing) bonds an invisible Ink Optimiser to the paper before inks are applied. The inks, in turn, bond to the optimiser. Text and lines are better defined, colours are more vibrant, tones are sharper, and print-outs become virtually water fast.

**And a host of other features.** The BJC-7000 can use both PhotoRealism and optional conventional inks with the black plus ink optimiser cartridge. Both cartridges produce an ink drop literally ¼ the size of earlier models, plus resolution up to 1200 dpi. Better plain paper use can lower operating costs. It even has the ability to print full-bleed A4 full card stock at paper-weights up to 550 gsm (0.8MM).



**Canon Customer Care.** There is a one-year warranty, upgradeable to three years for minimal cost, and it is backed by Customer Care hot-line support. Drivers are available for DOS, Windows® 3.1x/95 and Windows NT.

No wonder Hard Copy Observer also said "Canon (has) seized the technological high ground ..." If you would like to learn more, call us on 1 800 021 167.



**BJC-7000 colour Bubble Jet™ printer – \$729<sup>RRP</sup>**

# Canon





## To Be, or not

*The line between pouring money into the next big thing or pouring it down the drain is very fine.*

*Only time will tell.*

**By John Sterlicchi**

One of the wry pleasures I have had over the past 20 years or so has been witnessing embarrassing new product demonstrations. PC folk are famous or infamous for demonstrating — and worse, selling — products that don't work properly. The most chuckles I ever had were while watching an IBM exec trying to insert a card in a PC during a keynote speech by Intel boss Andy Grove on how easy it had become to upgrade your PC.

The exec actually snapped the cards, as the audience tittered. Recently those titans of the software industry Bill Gates and Larry Ellison have also had to suffer on-stage crashes — courtesy of Windows 98 and the Network Computer respectively — that would have made lesser egos blush with embarrassment.

So I was expecting the worst when I went along to see a demonstration of the upstart BeOS operating system. However, I was pleasantly surprised because the first release of the OS to run on the Intel platform worked brilliantly. The demonstration was to show what BeOS could do with voice and video . . . and believe me, it could do plenty.

The man who provided the entertainment, Be marketing and sales vice-president Alex Osadzinski, is a true 'demo-god' who claims to have perfected his act at the same time as he was on his knees begging Silicon Valley venture capitalists for funding.

That funding eventually came through to the tune of about \$US22 million and the BeOS has moved from being a crazy idea dreamed up by ex-Apple technologist Jean Louis Gassée to an operating system that works on both Pentiums and PowerPCs, and developers around the world are scurrying to ready applications for it.

I wasn't the only person impressed with how BeOS handled multimedia; the people at Intel were too. Claude Leglise, an Intel vice-president, said, "It makes the platform

look wonderful. The initial reaction at Intel was 'I didn't know a PC could do that.'" Leglise said the BeOS complemented Windows, as it was developed from the ground up to handle media (audio and video). "We believe it can open new markets for Intel, appealing to the digital content community who are not historically Intel users, and to creative enthusiasts or pro-sumers," said Leglise. He also pointed out that 100 million PCs will be sold this year and if Be only had its OS on 1% of those machines, "you have a business".

Whether Be in fact does have a business I feel is still too early to project, but these are interesting times in the world of operating systems, and doors that were previously closed to a company such as Be are opening ever so slightly.

### Doors that were previously closed to a company such as Be are opening ever so slightly.

An interesting move is afoot in the US to encourage PC makers to offer alternative operating systems on their machines. Microsoft's muscle — not to mention its written contracts — has discouraged PC makers from doing any such thing in the past; but now the software giant is mired in legal trouble, the time could be ripe for change.

One man pushing for just such changes is the US's number one consumer advocate, Ralph Nader, who has decided to add Microsoft to the list of major corporations he has antagonised over the last 30 years.

His latest move was to write to several major PC makers to try and get them to offer alternatives — one of which was the BeOS — other than Windows to customers. At the time of writing, Nader had not heard back from the companies.

Nader's influence in the US corridors of

power is enormous — and is often underestimated outside the US, and since he climbed on the anti-Microsoft bandwagon a few months back, opposition to the software giant became much more focused.

While Microsoft isn't moving full-steam ahead, and with Apple's OS plans in a state of flux again, there is a fair chance for Be. At present the OS is not really ready for the mainstream Intel user who just wants to turn on the machine and let it wing.

That version is about a year away. However, it is ripe for techies and developers who want to create new types of multimedia applications. And the clever folk at Be have ensured the OS works with Windows and that there is a dual-boot function.

No-one really wants to give up Microsoft Office. The word I hear most when people talk about the BeOS is 'baggage', in so much as it doesn't have any. The designers don't give a hoot for backward compatibility, they just want to build a lightning-fast multiprocessing operating system, or as they say in the corporate blurb, "the first, true media OS designed to meet the high-performance needs of digital content design".

There are still sceptics out there who believe the venture capitalists and Gassée himself are just throwing their money down the gurgler. I'd like to think that Gassée knows what he is doing.

After all, he reputedly wouldn't budge on his asking price of \$400 million back when Apple (in the days of Gil Amelio) wanted to buy Be for its OS. He either knows what he's doing, or he's crazy. ■



# A2

**W**hen it comes to superior paper handling, the BJC™-5500 has no rivals.

**More paper feeds.** It comes with a tractor feed to accept continuous form (computer paper), and a manual feed for cut sheets up to A2, or envelopes. To this you can add two optional cut-sheet feeds so, for instance, you could have letterhead and standard paper feeds at the same time.

**To do more jobs.** Obviously the BJC-5500 has the paper handling for almost every one in the office from accountant to artist, and engineer to receptionist. Its appeal is further

# A3

The Canon BJC-5500 can do something that no other printer can,  
**print more paper types.**

Envelopes

# A4

Overheads

Computer



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# Canon



# The need for speed



Whether you're building your dream PC from scratch or upgrading an old slug, a CPU will be at the top of your shopping list. There's a huge array of processors, including Pentium, Pentium II, Celeron, AMD K6, AMD K6-2, and Cyrix/IBM CPUs, all in a range of different speeds.

Intel and AMD processors are the most popular, and despite their prevalence in the market, it's best to shop around as prices vary between stores. Prices are also constantly changing, so you should be able to get even cheaper quotes than Price Watch received in late August. Most retailers sell components separately, catering for techies who want to build or upgrade their own PCs.

Probably the most commonly upgraded PC components are the CPU and RAM; a speedy machine is a good machine. For those heavily into graphics or gaming, a fast CPU is an essential. Price Watch contacted retailers for quotes on both an Intel Pentium II 300MHz and an AMD K6-2 300MHz. These are the chips of choice in upgrading machines as they are affordable options which provide enough boost for a flagging machine to make it all worthwhile. If building from scratch, you probably wouldn't want to have anything less. While a top-of-the-range Pentium II 400 is impressive, at about \$1,400 it's out of most PC owner/builders' price range.



We also requested a price on 32M of SDRAM.

The sales representatives we contacted had varying views on which chip to buy; the representative from CD Computer World said the Pentium II 300 is better as it is "more reliable". The representative from Performance Memory and Peripherals said, "There's not much difference between them. Intel is selling its name." The representative from Ecom Computers recommended the AMD processor, noting that it runs best on a 100MHz motherboard, although it will also still run on a 66MHz motherboard design but noticeably slower. He claimed the AMD K6-2 300MHz is faster than a Pentium II 300, and as fast as a Pentium II 400 when run on a 100MHz board. APC's tests have found "the K6-2 is as good as a Pentium II of the same clock speed in general operation, and quite a bit better when an appropriate application makes use of the new instructions" (see APC August, page 31).

Upgrading your CPU may necessitate buying a new motherboard. For \$499, Adelong Computers offered an AMD K6-2 300MHz processor bundled with a Chain-tech 5AGM2 motherboard (sold separately for \$155). A Chaintech Pentium II BX Mainboard was quoted at \$275.

The price of 32M of SDRAM was consistently priced between \$70 and \$83,

although BBD Computers did offer a special for \$60. The AMD K6-2 300MHz will set you back about \$400; prices ranged from \$330 to \$442. Prices on the Pentium II 300 varied considerably, from \$543 to \$739. Frank's Compware, which sells over the Web, had the cheapest prices, and although the Pentium II 300MHz was not in stock, \$699 for a Pentium II 333 was very reasonable. Goods can only be ordered online, via fax or via email, and the price does not include postage.

See this month's Step by Step (page 146) for some tips on buying components and upgrading your machine. ■

## Our charter and method

Price Watch is an exercise in comparative technologies and relative prices. All investigations are conducted anonymously, and records are kept of conversations. Prices and system capabilities printed here are provided by the sales staff at the offices we contacted, and all information is as supplied. While we assume that these are correct, we cannot accept any responsibility for errors or omissions. Neither will we be held to account by companies mentioned here for omissions to product ranges or system capabilities. The responsibility rests with sales staff to provide adequate information, as the company would expect them to do with every customer.

## Processors and memory

Company	Contact	Components	Price
Adelong Computers	1800 626 345 <a href="http://www.adelong.com.au">http://www.adelong.com.au</a>	32M SDRAM AMD K6-2 300MHz, Intel Pentium II 300	\$75 \$365, \$505
BBD Computers	(08) 9450 2179 <a href="http://www.bbd.com.au">http://www.bbd.com.au</a>	32M SDRAM AMD K6-2 300MHz, Intel Pentium II 300	\$60 \$429, \$739
CD Computer World	(02) 9716 9023	32M SDRAM Intel Pentium II 300	\$90 \$700
Computer Talk	(03) 9769 5277	32M SDRAM AMD K6-2 300MHz, Intel Pentium II 300	\$71 \$442, \$543
Ecom Computers	(02) 9299 0022	32M SDRAM AMD K6-2 300MHz, Intel Pentium II 33	\$79 \$430, \$920
Frank's Compware	<a href="http://www.compware.com.au">http://www.compware.com.au</a>	32M SDRAM AMD K6-2 300MHz, Intel Pentium II 33	\$83 \$340, \$690
Performance Memory and Peripherals	(03) 9686 3244 <a href="http://www.performancememory.com.au">http://www.performancememory.com.au</a>	32M SDRAM AMD K6-2 300MHz, Intel Pentium II 300	\$79 \$412, \$591



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- McAfee Virus Scan
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APC receives some 50 vendor, manufacturer and ISP complaint letters each month. What happens to them? **By Roulla Yiacoumi**

# The things we do



K readers, this month it's time to get personal. I have been writing APC's Service & Reliability consumer column for some 15 months, and in this time I've received hundreds of letters from you. Each month, I read every piece of correspondence, whether it be email, fax, scribbled note, or letter in the post.

Even though I feel deeply frustrated and angry after I read some of your tales of woe, I appreciate receiving your personal notes. They tell real stories from real people — who have been let down by PC and related vendors. The information you provide is extremely valuable and represents a better indicator of the industry than any market research could ever uncover.

I keep a detailed list of your complaints and comments and, to date, have developed quite a comprehensive personal database of both good and not-so-good companies that you have told me about.

So, what do I do with all your letters?

As you know, we publish only one complaint each month but this does not mean the rest are ignored. I consider every genuine letter for publication, but at the end of the day, I need to select one which I feel has the greatest relevance or interest to the majority of our readers. In the past, I have covered topics such as faulty goods, warranties and refunds, late deliveries, ISPs which overcharge, slack service and misleading signs in stores. Because of the sheer volume, letters cannot be answered personally, but I do read them all. And I keep every single one of them.

The first step after receiving a written complaint for publication — and yes, they must all be *written* — is to contact you, the reader (this is why it's important to include a daytime contact number with your letters). I need to establish that the complaint is genuine, check what kind of further information you may have (faxes, quotes, records of telephone conversations), and discuss the issues raised in the letter. As your letter is sent to me in absolute confidentiality, I must then seek permission from you to chase up your complaint with the company involved.

The company is then contacted and informed that APC has received a complaint letter and that to be fair to both sides, we invite the company to respond. I request a response within seven days.

Now, telling a company I have a complaint letter I am considering for publication results in one of several responses.

I have been threatened with defamation lawsuits by tough-talking companies scared to tackle legitimate consumer complaints and absolutely petrified at the thought of having a 'bad' letter published in Australia's leading computer publication.

I have been told by some companies that they are advertisers in APC magazine and that it is not appropriate for me to publish such a letter. A few go one step further and threaten to withdraw advertising from the magazine.

Further, I have been informed that if I publish a letter, the company will defame APC in any way it sees fit, including slandering us on its Web site and anywhere else it chooses.

Fortunately for our readers, we do not submit to such threats — in fact, they anger us even more. No-one can 'buy' or squirm their way out of having a letter published. If the letter raises serious consumer concerns, we do not hesitate — we publish. APC has a readership of over half a million each month (print and Web versions combined). We always remain impartial and provide honest and reliable information. This tough stand not only applies to our Service & Reliability column, but to our reviews and editorials.

At this stage, some of you may be wondering why vendors are not aware of how to adequately address complaints in the first instance so that they are not elevated to this status. I am equally amazed that such companies do not know how to correctly deal with the media when it asks for a response to a complaint letter.

The ideal response would be to express concern that APC has received such a letter, say that the company will be very happy to take a look at it, and that a written response suitable for publication will be forthcoming. The companies that take

the extra step and contact the disgruntled consumer to make amends are the ones that I predict will still be here tomorrow, making repeat sales and working hard to earn the trust and loyalty of the consumer.

Last, but definitely not least, the final step before APC can publish its monthly Service & Reliability column is to have the legal department of Australian Consolidated Press, our publisher, check over the material and give the all-clear to proceed.

If you have a complaint, or any questions about Service & Reliability and how it operates, drop me an email at ry@acp.com.au. I'm always happy to hear from you. ■



CONSUMER

**Tell us all about it**

Service & Reliability is APC's consumer column. We invite you to send details of your buying experiences to:

**email** complaints@acp.com.au  
**fax** Service & Reliability at  
 (02) 9264 6320  
**mail** Service & Reliability,  
 Australian Personal  
 Computer, Level 8, 54 Park  
 St, Sydney NSW 1028.

Please keep your letters to no more than 300 words. All letters must contain a full name, address and contact phone number.

APC reserves the right to edit any submitted material for length and clarity.

We can publish only a selection of letters each month and regret that letters cannot be answered personally. Please note that issues in this column are discussed in relation to federal consumer laws, and readers should contact their respective state consumer affairs or fair trading department for relevant local information.



*The use of portable electronic devices in planes can impact crucial aircraft systems.*

# Switch them off

**J**ust as we were getting used to being constantly on call via our mobile phones and always at work thanks to laptops (as well as endlessly entertained by a growing number of portable music systems), we now have to learn that there are times when we need to switch them off. Sometimes it's not just impolite to leave such devices switched on, but downright dangerous.

Inside a plane is one such example. Modern aircraft rely on sensitive electronic equipment to function, and these are affected by portable electronic devices, so it is imperative to switch them off during take-off and landing (power-saving mode is not adequate).

Any electronic device taken onboard an aircraft has the potential to interfere with aircraft equipment, said Joe Hattley, manager of the technical services section at the Bureau of Air Safety Investigation (BASI). That includes laptops, mobile phones, portable AM/FM radios and CD players, and gaming systems such as Nintendo Game Boys. Every electronic device generates electromagnetic energy, said Hattley, and all aircraft equipment operates on radio frequencies where there is little room for error in signal strength and quality. "The device can interfere with the electronic systems in the aircraft. The most notable effects are interference with the aircraft navigation system, noises in the radio, and instrument deviations."

There are many kilometres of wiring throughout the fuselage of an aircraft for flight controls, navigation systems, passenger entertainment systems and so on. "Remember you are sitting in a metal tube, so any energy you radiate into that metal tube gets sent around that tube and will also affect any wiring in the aircraft. It gets bounced around," Hattley said. He added that many of the navigation and radio systems rely on antennae located in many places inside and outside the aircraft. Any devices that generate electromagnetic interference seem to affect systems which rely on antennae.

That equipment is still being used in cruise mode, but it is more critical during take-off and landing. Large transport aircraft perform instrument approaches, where they use the instruments onboard to get the aircraft to a minimum altitude in



order to land. If you were to use personal electronic devices during landing, it could put the information from the flight instruments out during a critical phase in flight.

"We have recorded 48 instances where we believe aircraft systems have been affected by portable electronic devices. Out of those, 29 have been as a result of laptops," said Hattley. "PCs, including laptops, are built for an office environment. If we install a computer on an aircraft, we have to comply with very specific and stringent requirements by the airworthiness authorities, and that includes shielding. Your average everyday laptop doesn't have all that shielding. Any energy it generates potentially could get into the aircraft."

Here are some examples of aircraft equipment affected by PEDs noted by BASI.

- In June last year an aircraft 185km north of Brisbane reported a constant squeal to VHF radios used for air traffic control communications. The interference was sourced to a passenger's laptop.
- In November last year an autopilot system was affected by two laptops; the aircraft continued a right turn instead of taking up a holding pattern.
- Also in November, a flight management computer map suddenly shifted three to four nautical miles left of the aircraft's known position as the plane became airborne because a video camera and computer game were in use.
- In January last year an aircraft in cruise mode above Queensland started to climb and descend about 100m either side of the flight level and roll about 3°

either side of wings level; a few laptops, a Game Boy and a CD player were switched off and systems returned to normal.

"You just don't know what it's going to affect," said Hattley. "You have to realise the environment you are in — you are 11km above the ground and travelling at a speed of 600km an hour. This is not your normal office environment."

Interference will vary widely depending on the portable electronic device as well as its location in the aircraft. "It's very difficult to track down which computer, which area of the aircraft is most vulnerable. There have been trials done and computers that have been shown to affect aircraft in flight once will not have the same impact if tested again. You just don't have the same combination of factors. It is very hard to duplicate. So at the moment we err on the side of caution and say only use them in cruise because we have events which we believe are linked to affecting the aircraft systems."

Under the current regulatory system, overseen by the Civil Aviation Safety Authority, it is up to the operators to ensure that no devices taken onboard their aircraft will interfere with aircraft systems. Operators include statements to the effect that electronic devices are not to be used, particularly during take-off and landing, as part of the safety briefing. You can use most electronic devices in cruise, such as laptops, but mobile phones and any transmitting devices should not be used at any time.

CASA is in the process of considering a regulation specifically related to portable electronic devices that will be released for public and industry comment in the near future, said Hattley.

"We haven't come to the point where we have had an accident where one of the significant factors has been a personal electronic device," said Hattley. "However, these kinds of devices are getting more and more powerful every year. As the power of computers increases there is more potential for interference." On the other hand, as aircraft become more complex and electronics oriented, so again the potential for interference increases.

**Selina Mitchell**

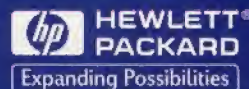


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*You may be surprised to learn of the extent of penetration of personal computing into Australian homes. By Toni Downes*

## Who uses what in 1998?

**H**ome computing has become a way of life for a significant number of Australians. The Australian Bureau of Statistics reports that nearly 3 million Australian households have a computer. The latest ABS survey shows that in February 1998, 42% of Australian households had computers, a percentage projected to rise to 50% in early 1999. Five out of every six of these households used their computer regularly (once a week or more).

Married couples with children were the biggest group of owners/users, at 59%, while people living alone were the smallest, at 12%. People living in capital cities were more likely to have a computer (35% were regular users) than regional users (29%).

Just over half of households that didn't own a computer said that it was due to lack of interest or need for a computer, and one quarter reported that the cost was too high. The remainder mentioned other reasons such as having access elsewhere or a lack of knowledge of how to use computers. It is reasonable that there will always be households which have no need for a computer in its current form, but it is of concern that many families just can't afford one. In regional Australia, access to facilities such as public libraries which have computers can also be difficult.

Some people would be surprised to learn that the Internet could be accessed from only 13% of Australian homes. However, households are expected to begin signing up with ISPs fairly rapidly. Of the homes with Internet access, more than half were occupied by married couples with children, and more than half were households with annual incomes greater than \$44,000. When looking at households with annual incomes below \$44,000, by far the most common reason for not having Internet access was cost.

Around 5.1 million Australians aged five years and over regularly used a home computer. School-aged children were by far the most common users, 51% doing so regularly. The percentages declined with age: 35% of 18 to 24-year-olds, and 30% of 25 to

55-year-olds were regular users. Only 8% of people aged 55 years and over who were surveyed regularly used a computer at home.

The gender gap closed somewhat between 1996 and 1998. In 1998, 33% of males and 28% of females regularly used a computer at home. For females, this represented an increase of 41% since 1996; use by males had increased by 24% over the same period. This follows long-term trends found in other national and international studies, that as computers become more widespread, gender differences in the numbers using them decrease. Males seem to lead the way and females follow later. Interestingly, the graph depicting type of use supports this trend, in the sense that the difference in Internet use, a relatively new household activity, clearly indicates a strong bias towards male participation.

In homes where the computer was used more than once a week, game-playing remained by far the most common activity. As the graph indicates, use for study and work-related purposes came second and third respectively. Family-related activities and Internet use were less common.

Peripheral devices in household computers continue to increase in both number and type. In February 1998, 89% of households with computers had printers, 74% had CD-ROM drives, 47% had modems and 16% scanners. CD-ROM numbers had doubled since 1996, while there were almost twice as many modems and four

times as many scanners. Not surprisingly, the percentage of households with Pentium-based machines and more than 16M of memory was beginning to outstrip those with older processors.

Direct comparisons between 1996 and 1998 were difficult because the uses published by the ABS in 1998 were classified somewhat differently from those published in 1996. However, some trends were clear. Internet activities had the highest increase of all computer activities, from just over 300,000 people in 1996 to 1.1 million people in 1998. By February 1998, 7% of all Australian school-aged children and 9% of all adults younger than 55 accessed the

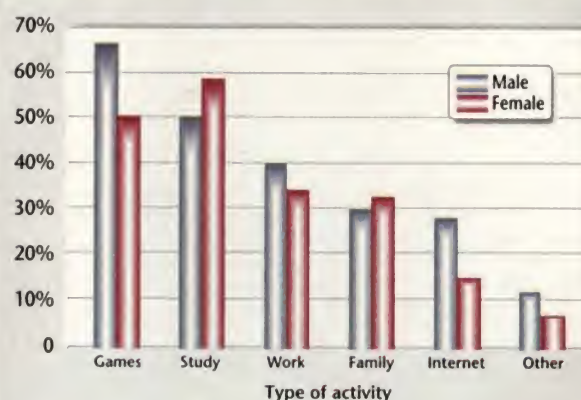
Internet from home. There were also large increases in the number of people using the computer for family activities. Males and females still chose different patterns of use: more males played games, performed work-related activities and used the Internet, while greater percentages of females carried out study-related and family-related tasks on the computer.

Gender differences were also evident in the frequency with which computers were used. About 70% of males but only 55% of females used the computer several times a week or more. Just over 20% of females used the home computer once a month or less, compared with less than 10% of males.


The ABS report shows a steady increase in ownership of computers and a dramatic increase in Internet access and use. It also provides a reason to pause and reflect on the continuing divide between those who can and those who cannot afford to have computers and Internet access at home. It serves to remind us that gender differences remain. It is not a problem in itself if males and females choose to use computers in different ways in the home. It is a problem, however, if those differences perpetuate stereotypes and reduce opportunities for females to participate in the computer age.

**Toni Downes is Associate Dean of the Faculty of Education at the University of Western Sydney, Macarthur.**

**How people use their home computer**







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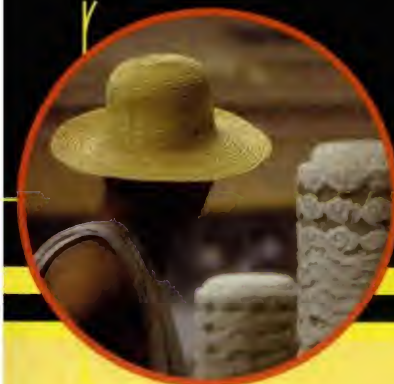


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"I don't know who discovered water, but it wasn't a fish".

**MARSHALL MCLUHAN**

Australia's proximity to the land mass and complex combination of cultures that we call Asia is an accident of geography — a happy accident, assuredly, but an accident nevertheless.

So, considering our geographic proximity but cultural disparity, can Australia call itself part of Asia? In other words, is Asia foremost a geographic or a cultural entity? Given either definition, will Australia ever be 'Asian', and is this something to which we, as a nation, should aspire?



While it would be too simplistic to ever say that anything that McLuhan wrote meant just this or just that, it's nevertheless easy to distil two relevant truths from this one observation. Firstly, the person or entity to benefit most from any given situation is rarely the one that created it in the first place; and secondly, larger forces outside the 'pond' will always exert a greater influence on any endeavour than the originator.

So it is with Asia, and Australia's relationship with the region. As we look towards the various countries which make up the whole, and contemplate their individual economic futures, we realise that ours is inextricably linked with theirs, as it is with the global economy. The fall in the Russian rouble signifies as much for Australian commo-





# Looking towards Asia

BY HELEN DANCER

ties exports (since we will now essentially be competing with Russia for the same markets with the same commodities but with a price disadvantage) as the ongoing 'Asian flu'.

Australia is well placed to compete regionally for the headquarters of large multinationals, and offers advantages, particularly in the case of technology. Lifestyle, climate and infrastructure, both in terms of business communications and educational opportunities, attract large companies and their employees to settle in Australia. In fact, competition is fierce between NSW and Victoria for multinational corporations; and there is a growing technology presence in South Australia, as there was, until the recent elections, in Queensland. The change in the dynamics of the Queensland parliament has made

the state a harder sell for the Beattie government, as the premier's recent trip to Hong Kong illustrated. The large number of languages spoken by Australia's multicultural population is also attractive to companies wanting to deal with the region from Australia, according to the NSW State Chamber of Commerce chief executive Katie Lahey.

Our ability to exploit the opportunities presented by this huge market depends to an extent on knowing not just our neighbours, but ourselves. Understanding how we're perceived in the region is as important as recognising and capitalising on our own strengths.

Lotus Singapore's Raphael Tan describes the opportunity represented by business in Asia as a complex matrix, with IT maturity at one end and long-term prospects at the other. No country represents both, he said. Nations in



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the region fall into one of three categories: those experiencing sophisticated, low key growth; those experiencing lots of action; and those poised to take off.

Singapore and Hong Kong both fall into the first category. Companies looking for significant long-term growth, however, might find that they have missed the boat, as investments in infrastructure have already been made in both countries. Conversely, market opportunities beckon, as the tide of demand for smarter workplace practices swells, and resistance to, or recovery from, the region-wide currency downturn takes effect.

Nations such as Thailand and Vietnam are just beginning to put infrastructure in place, and may represent significant opportunities. Yet other countries, notably Indonesia, have economic problems of such magnitude

that fundamental reform at all levels of political and social life needs to occur before there's any guarantee that children can continue to be fed, let alone businesses computerised.

Economies willing, the vision of IT transforming the workplace and delivering a competitive edge has a groundswell effect, Tan observed. The desire to do things smarter and faster leads to office automation, which then leads to an expanded demand, usually for email. Then it becomes evident that email in itself doesn't deliver a return on investment, but, when users understand what they are doing with it, it leads to an enterprise-wide clamour for business process reorganisation.

So how does this apply to Australia and its place in the region? In order to understand where our opportunities as neighbour and provider exist, we need to understand something of the myriad cultures that make up the market we blithely refer to collectively as 'Asia'.

The Chinese market produces great hardware and offers substantial market opportunities both to local and multinational vendors. Will its competence and consumption lead to office automation and email, then business process reengineering? Not necessarily, according to Tan, because of the intrinsically people-oriented nature of Chinese culture.

In Chinese, and also in Japanese societies, people have a stamp which has a similar function to a signature. The fact that a document is marked with a person's individual stamp signifies that they have personally seen it and approved it. And you can't do that with a computer. "We don't want to lose some of the inherent characteristics of our own culture," said Tan.

The other factor to be emphasised is diversity. With the

handback of Hong Kong from British to Chinese control, he observed, the residents of Hong Kong, as well as the Chinese, seem to have the best of both worlds. China no longer has to relive the teething troubles of the information revolution, since much of the groundwork has been done in Hong Kong. On the other side of the coin, for Hong Kong people, he said, the breadth of opportunity the Chinese market represents means that companies in Hong Kong have real and unlimited future prospects. "China has on tap all that made Hong Kong what it is today," he said. China, in his estimation, will endeavour to model its various regions around the way Hong Kong is structured and manages growth. The significance of tapping the Chinese market cannot be understated; indeed, companies are going to extraordinary lengths to get comfortable in the region. US software house Symantec, whose regional headquarters are in Sydney, recently sent a group of managers to Beijing for a six-week intensive language course in Mandarin.

The relationship between Hong Kong and China is unique. None of the other emerging nations in the region

In order to understand where Australian opportunities exist, we need to understand something of the myriad cultures that make up Asia.

can boast such a valuable testbed, and each has varying degrees of governmental regulation, intervention, protection, direction and control. Malaysia's Multimedia Super Corridor and Singapore's Intelligent Island strategy are both government-driven. India's early IT forays have grown from the relatively uncoordinated and unsupervised grassroots of an excellent education system, and a few hushed investments by major software multinationals. Thai and Vietnamese forays into the information revolution have been temporarily stymied by ongoing economic hardships.

The duration and quantifiable costs of such hardships are difficult to predict. On a daily basis the press predicts new slumps in the yen, and forecasts are that despite individual nations' best endeavours and resolve, their fortunes are inextricably tied to the performance of the yen, and Japan's economy and resolve to implement political reform.

Here too there is a silver lining. One of the flow-on benefits of the turmoil in the region will be the potential to attract skilled IT staff to Australia. Gartner Group predicts that 20% of Asian IT professionals, given the opportunity, will move in order to preserve or improve their standard of living. Australia could benefit substantially from this skills injection, given the industry-wide clamouring for IT staff (see APC September, page 65). However, Singapore and the US are also enticing destinations.

This report aims to be illustrative, rather than all-inclusive. It includes the countries of South-East Asia, and India. Japan is included only to the extent of its potential to affect other economies.

To read APC's expanded coverage of the issue, please visit our site at <http://www.apcmag.com>.







**Gotta get that design Interstate?**



## SINGAPORE:

## Intelligent island

**I** met a Singaporean gentleman in Hong Kong, in a coffee shop of the now superseded Kai Tak airport, and we struck up the sort of conversation bored travellers with long hours between flights are accustomed to. Australia, he said, was a wonderful country, so much space, so much opportunity, so much friendliness and so much food.

God has been good to Australia, he opined.

Singapore, in contrast, has had to rely on its people, its intelligence. Singapore is small, he said, surrounded by much bigger nations, and, because of its size, has to rely on native nous rather than natural resources. It has turned to technology, and in its smallness, has realised the crucial nature of innovation. In this way, he said with a smile, it proves God is on our side.

Nothing more accurately symbolises the differences between the two countries and their two disparate mentalities than this single observation.

Like Israel, Singapore has turned its lack of natural resources into an advantage.

While it's fair to say that Malaysia's Multimedia Super Corridor has probably been more of a spur to the Singaporean government (or is it vice versa?) than Australia's planned electronic infrastructure, if you placed the three countries' endeavours greyhound-like on a race track, it would be the Singaporean whip-pet streaking to the finish line, while the others puffed away in pursuit.

In Singapore, it's illegal to spit in the street, so people don't do it. Not because it's an antisocial thing to do, but because they're afraid of getting hauled up in front of the authorities. Likewise, visitors are warned about bringing chewing gum into the country.

The reason for highlighting the extreme regimentation of the Singaporean streetscape is to set the scene for the tremendous success of the Singapore ONE infrastructure project and IT2000 strategies orchestrated and managed by the country's National Computer Board (NCB). It is much easier to imagine a population with such an easy temperament, regulated to the point of public exhortation, slipping comfortably into such a totalistic electronic environment, than to envision the

same happening in any one of the free-form economies that surround it.

Singapore life is reported to the population through a highly disciplined, government-supervised media infrastructure — although government representatives insist that the government's supervision is benign. The paradigm of heavy control extends to the Internet, where citizens can choose between only three ISPs for their connection. From an Australian standpoint — here there are more than 600 registered providers from which to choose — the Singaporean government's claim that three providers represents real choice seems somewhat hollow; yet the suggestion causes surprise to most Singaporean business people. The notion of 600 seems somewhat "disorganised" according to one.

The country's ubiquitous infrastructure and content delivery project (IT2000) has the collective skills, support and advisory capacity of the Telecommunications Authority, the Singapore Broadcasting Authority, the Economic Development Board, the National Science and Technology Board and the NCB as the fifth partner.

Together, the Singapore ONE and the IT2000 projects represent an overarching infrastructure and content strategy which takes in every facet of business, educational and family life, from early childhood learning to news on demand and continuing education programs, through to filing your tax return online. Once the plan is fully implemented, citizens will be able, with equal ease, to work from home, or to contact their children at home from the office via videoconferencing links. They will be able to hire a maid, or play chess with their children remotely.

The IT2000 plan has been interwoven with the social fabric, and recognises that technology must embellish and sustain current family and work structures, rather than risk replacing or breaking them down. The NCB's charter takes a holistic approach, emphasising that the upgrading of electronic infrastructure will go hand in hand with upgrading more tangible facets of life. Singaporeans are promised nicer townhouses to live in, 'pedestrian-friendly' streets and better public transport infrastructure, and facilitation of social and administrative encounters, such as communicating, access to entertainment and bill paying.

By the end of this year, Ng Kin Yee, the NCB's assistant director for New Media, said the project will aim to have connected over 800,000 people, with a combination of technologies covering all aspects of communication, from copper wire and ADSL for phone services, to cable modems and a cable TV network for delivery of content at the other end of the bandwidth spectrum. Set-top boxes are key to the rapid take-up of the fast communication on offer, he said.

All this is taking the horse to water; but will it drink? If you have the right strategy — if you offer the right mix of services and clear benefits in terms of convenience — the impact will be significant, Yee affirmed. "By the end of the







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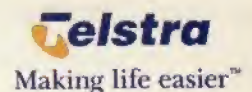
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year we will be offering access to 90% of people. But whether they use it is up to them." Nobody's going to shut down the bank or the tax office and force people to make their transactions online, he said. The electronic infrastructure is being promoted as an alternative. But there's no doubt in his mind that it's an infinitely superior alternative.

Such a comprehensive project begins, of course, with cable, and lots of it, and, according to Yee, size in this case is an advantage. The whole island is wired with some 646km of broadband cable. Additionally, there has been a strong focus on equipping the population, educationally as well as technically. Yee told APC that Singapore has been rated second in the world in terms of an IT-literate population, and said that the already enviably high penetration of computers in homes — estimated at 41% — will grow to more than 50% by the end of the year.

The Singapore ONE infrastructure project began in June 1996, and was carried out by a consortium called 1-Net, made up of government and commercial partners, notably Singapore Telecom, Singapore Communication Investments (the investment arm of the Telecommunications Authority of Singapore), Singapore Cable Vision, Pacific Internet and CyberWay.

In November last year the country signed a Memorandum of Understanding with Canada to reinforce commerce relationships between the two countries.

The strategy is also enhanced by powerful partnerships. The Singaporean government has attracted the world's best players — brand names such as Hewlett-Packard, Lotus and Intel — with 'sympathetic' tax structures which include programs such as the Pioneer Service Status, the double-deduction incentive and a generous investment allowance. It also offers substantial R&D support (up to 70% of qualifying costs) from the National Science and Technology Board for companies co-producing or developing technology that can be applied in the Singaporean context, but which evidently would also have broader, even global application.

And wherever else in Asia the currency meltdown is having an effect, for most of the organisations APC spoke to it was business as usual. "I can't say we have gone unscathed, but you could also say that the production of electronics and their components, like hard drives for example, is always cyclical. What we have experienced is no more severe than that cycle," Yee said. "We are not seeing the effects from users. But what we do have to do is take care to be sensitive to the investment decisions of our partners." The government is still committed, he asserted, and the chairperson of the National IT Council recently announced that the government will spend \$S150 million on the Singapore ONE project over two years.

Gartner Group noted a drop-off in spending in the business sector at the end of last year, but agrees with the positive outlook for Singapore amid the chaos. Unlike those countries affected the most severely, Singapore's landscape is characterised by sound government, keen investment and smart business practice — a combination which will stand the economy in good stead.

Helen Dancer

## MALAYSIA: Hard sell

**T**he US's Silicon Valley is the envy of many nations trying to achieve economic gain through technology advancement. It seems everyone wants their own patch of IT&T innovation and enthusiasm, and the resulting boost to their economy. Perhaps none more so than Malaysia.

The country moved successfully from a developing nation to an emerging economy by emulating Japan's economic strategies. In more recent years it has looked to Western economies, and particularly a small area in California, to further develop. The aim is to become a fully developed, matured and knowledge-rich society by 2020. The first step in Malaysian Prime Minister Dr Mahathir Mohamad's Vision 2020 scheme is the development of the Multimedia Super Corridor (MSC).

A stretch of land the size of Singapore south of the Malay capital is being transformed into a new community. The aim is to quickly create an environment that fosters a highly competitive, world-class cluster of local and international IT companies, and to use this 'plug and play' 'country within a country' as a testbed for implementation throughout the rest of the nation, as an incubator and accelerator of new technologies, and to develop intelligence.

"In Malaysia, we have taken the pragmatic approach to entering the information age," said Mahathir while visiting the CeBIT 98 trade fair in Germany earlier this year. In order to reach developed nation status, he said, Malaysia needs to achieve 7% annual growth until 2020. This would take more than a good manufacturing base. The aim is to use the corridor as a high-tech testbed to explore multimedia capabilities.

Mahathir was at CeBIT on one of his many sales trips looking for strategic partners: he has been on similar forays to the US, Japan and the UK as well as neighbouring Asian nations. He has already gathered the support of many leading IT&T firms, who have committed to setting up operations in the MSC. Mahathir has also gathered some of the best brainpower in the digital world to form an International Advisory Panel to help formulate plans for the area. Members include the chief executives of IBM, Microsoft, Sun Microsystems, Netscape and Oracle.

Malaysia does not intend to enter the information age alone, nor does it intend to make the same mistakes as early adopters, but it will take every step to leapfrog into the information age. Foreign investment in the project is crucial to its success.





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"To you it might seem audacious," said Mahathir. "We admit we are just taking the first steps." For a country like Malaysia, which is far less knowledgeable, these are giant steps, he said. "We have a lot to learn. We cannot embark on this alone. That is why we turn to you."

The incentives are numerous. The MSC, once fully functional, will provide housing, a hospital, educational institutions, entertainment, the latest communications technologies and R&D and production facilities. Special cyberlaws (such as computer crimes, copyright, telemedicine and digital signatures legislation) and investment incentives have been put in place.

Now, however, Malaysia is on a sales mission of another nature. The economic crisis in the region has hit its economy hard. In the first quarter of this year the economy shrank by 1.8%, after 13 years of high growth. The government has forecast GDP in 1998 will be -1% to -2%. So far, IMF intervention has been avoided, as Malaysia has low foreign debt and high domestic fiscal reserves, but to ensure none is needed, Malaysian officials are travelling the world seeking foreign investment. The aim is to inject \$15 billion in public money into the banks.

It appears nothing will stop the Mahathir Government's dedicated effort to make the MSC a success, however. There has been an 18% cut to government spending, but the MSC was spared. Construction is on or ahead of schedule, said government officials.

## About the MSC

If the plan succeeds, the Multimedia Super Corridor will become a global super park for multimedia development, as well as a means of kick-starting Malaysia's push to achieve developed nation status. The MSC includes two of the world's first smart cities, Putrajaya (the new centre of Malaysia's paperless government) and Cyberjaya (the nucleus of the MSC and base for what Mahathir hopes will be 500 innovative multimedia companies).

Cyberjaya will house a multimedia university, telemedicine hospital, accommodation, parks and an international school. All will be connected via a high-capacity global telecommunications and logistics infrastructure, built on a 2.5G to 10G digital optical fibre network. The laying of 1,100km of fibre-optic cable was completed in October last year.

The university will, like Stanford in California, be an intellectual hub, surrounded by research labs and companies attracted to the region by tax incentives and relaxed work visa requirements.

Development within the MSC will focus on seven applications: electronic government, telemedicine, smart schools, a national multipurpose card, R&D clusters, worldwide manufacturing webs, and borderless marketing centres.

**Selina Mitchell**

"The financial crisis is not going to affect the Multimedia Super Corridor," Mahathir said earlier this year. "We have made it a priority project. Most of the investment has already been made." What is needed is investment from companies, he said, and expenditure by international companies is not something which has been heavily influ-

enced by the crisis. (It does, however, sometimes affect their confidence in investing.)

There are rumours that some backers now have concerns regarding Malaysia's ability to meet promised objectives. The MSC has always been a means to a high-tech, knowledge-rich end, and since the country's economic downturn, its significance has only increased.



"In the current economic situation, the government wants us to expedite construction rather than slow down; they want us to keep the momentum going," said a representative from the Multimedia Development Corporation (MDC). The new airport has been operational (after a few computer-related hiccups) since June, the fibre-optic backbone was installed late last year, phase one of the university was completed in September, and in the same month the government and its adminis-

tration was expected to move into its new paperless offices at Putrajaya. Transit offices in Cyberjaya have been fully rented; 50 companies will be accommodated by the end of the year. About 20 companies have purchased land to construct their own offices.

"We are looking forward to a time in the very near future where content creation and software development will fuel the formation of new service-based industries. The burgeoning telecommunications service providers will benefit from the rich supply of digital-based content," said MDC executive chairperson Dr Othman Yeop Abdullah in an MDC publication, *MSC.comm*.

The hard sell is getting harder, however. While Malaysia insists it is still 'all systems go', a great deal of credibility in Malaysia and in Dr Mahathir has been lost this last year, according to Gartner Group. "Remarks made by Dr Mahathir have not put overseas investors at ease, as he blames everyone except his own administration for the problems that now beset Malaysia."

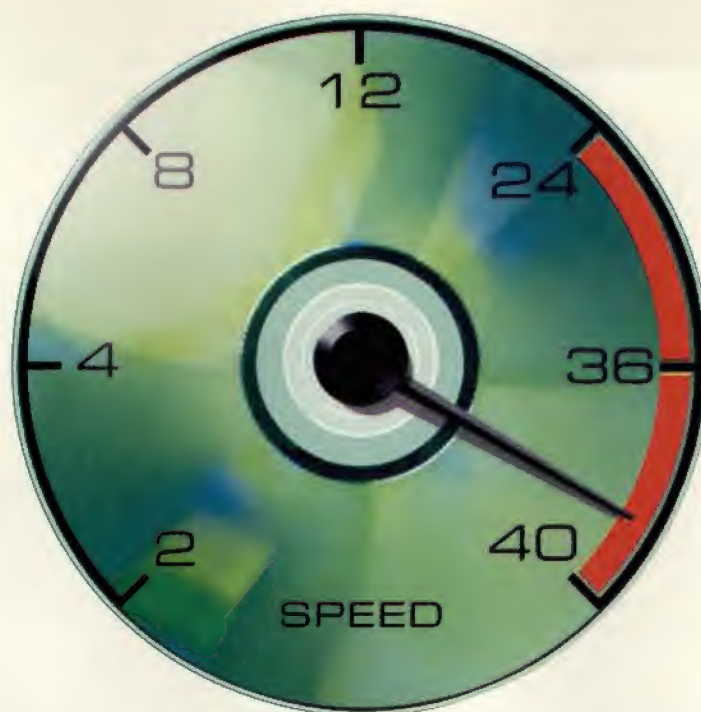
In an effort to ensure the development of Cyberjaya wouldn't be hindered by the economic downturn, or the speed of its progress dampened, the MDC recently acquired a controlling stake in Cyberview, the developer of the 2,800-hectare flagship zone in Cyberjaya.

The rhetoric suggests the MSC is galloping along; anecdotal evidence suggests construction is slow. Regional economic uncertainties are deterring many companies from setting up in Malaysia, and reports have suggested water rationing in the Klang Valley, a large area which includes Kuala Lumpur, has caused some major international IT companies to consider relocating to another country.

The economic downturn in the region is not the only hurdle to overcome. There is still an impression that Malaysia is not ready to become a home for advanced technology — images of traffic jams, frustrating telephone conversations on scratchy lines and half-finished construction are still common, and aren't helped by the problems experienced with the opening of the new airport.

**Selina Mitchell**





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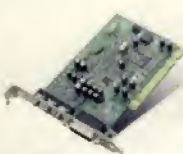
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## KOREA:

## Think big

**A** group of IT journalists recently travelled out of Seoul towards a Samsung factory in a Samsung bus on a Samsung-constructed highway and saw Samsung transporters carrying Samsung-owned wool and parts. On arrival at the manufacturing plant journalists were shown Samsung-badged computer electronic goods and IT&T products, as well as a number of OEM systems produced for leading US PC suppliers. Samsung said it alone provides 13% of Korea's GDP, and had 35 businesses worth \$US108 billion in 1997, employing over 250,000 people.

Vertical integration is the norm in Korea, where you see Lucky Goldstar (LG) petrol stations alongside an LG electronics equipment distributor. Names such as Daewoo, Hyundai, LG and Samsung dot the Seoul landscape much like McDonald's and Coca Cola do in other regions. These multifaceted companies, or chaebols, as they are known,

## Taking the high road

How times change. Until recently, the Republic of Korea was the 11th largest world economy, and it had achieved spectacular and enviable annual growth in GDP as well as practically nonexistent unemployment. Then along came the slide: international nervousness over the economic crisis in Thailand led to a rapid decline in the value of the won. Official attempts to steady the losses lowered foreign currency reserves and led to short-term debt pressure and a balance of payments crisis.

Korea sought and gained help from the International Monetary Fund (IMF) in December. The \$US58 billion support package, of which Australia contributed \$1 billion, was conditional: the Korean government must tighten its monetary and fiscal policy, and reform the financial sector.

There is a view that perhaps South Korea will be the last to enter and the first to exit the region's financial crisis. GDP is expected to contract by about 5% this year and economic recovery is not expected before 1999. However, some positive signs were being recorded by August and US trade officials have suggested the worst may be over: the country's trade surplus had decreased, interest rates were back to pre-crisis levels and the won had slightly increased in value and steadied. Foreign exchange reserves may have dramatically increased, but the country's foreign debt is estimated to be \$US150 billion.

There have also been warnings that the same complacency that left reform measures to the last minute would affect the recovery process. It has been reported that some reform efforts have been put on hold amid hopes they won't be needed.

Selina Mitchell

have survived and prospered through diversity, trading off losses in one area with gains in another.

The chaebols are also buffered by the immense patriotism of the Korean domestic market, sometimes described

as xenophobic. Media campaigns urging consumers not to buy foreign goods have long been a tradition, and it is considered unpatriotic to leave Korea, even on a business trip, according to industry analysts at Gartner Group. When the Kia car manufacturer began floundering, many Koreans went out and bought new cars just to offer support.

This dogma was promoted by the military regimes that dominated Korea after the Korean War and until the early '90s. There was clear hostility towards foreign governments and investment, which were regarded as enemies of the people. But the present government invites and encourages foreign investment, said Koh Jung Sik, commercial counsellor at the Embassy for the Republic of Korea. He did note that Australian IT companies wanting to invest in the region should partner with local firms, and added that the Australian and Korean governments have agreed in principle to encourage development in the technology industry in both countries. A number of joint research projects are under way, he said.

New economic realities are changing Korea. There is intense pressure for some chaebols to trim unprofitable subsidiaries and restructure, and calls for others, already in receivership but still operating, to close down. It has been reported that three conglomerates will swap some of their major businesses, with suggestions that LG and Hyundai will transfer chip manufacturing to Samsung. Samsung will offload consumer electronics to LG and Hyundai will hand over its information and communications arms, and so on. As yet, however, nothing has been finalised.

While there is pressure to solve the over-capacity problems in the automobile and electronics sectors, scared workers are demanding promises that they will not have to join the growing number of unemployed. The semiconductor market is a prime example. Korean players dominate the market (two chaebols hold a 28% share of the world DRAM market for example), but they have had to dramatically cut chip production to offset declining product prices.

Korea is still regarded as a major supplier of IT goods. The government is attempting to export its way out of trouble, and IT production will play a role. In 1997, Korea's share of the Asia-Pacific IT&T market was 19%. Korea's total electronics output ranks it fifth in the world. Major export items include memory chips, CDMA telecommunications systems, consumer electronics and medical diagnostics equipment, said Koh. Last year, telecommunications and information market exports were worth \$US32 billion.

Korea's large IT industry is intensely competitive — and wary. One large manufacturer recently upgraded its security after industrial spies were caught attempting to sell information on its latest DRAM developments to Tai-





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wan for \$100 million. It is not so protective of its human capital, however. Corporate restructuring due to the crisis is generating large numbers of highly skilled, redundant workers. Unlike many other countries battling to find staff, Korea has too many, and is profiting from the problem. The Ministry of Information and Communications is setting up a new IT business promoting the export of software experts to the highest bidder. Some companies are renting out staff to other countries to work on projects. The outflow of IT workers is expected to increase as more companies move abroad and establish partner relationships with overseas investors, said a ministry representative.

While the export industry is holding its own, the 45 million-strong domestic market has slumped. Domestic consumption of IT equipment is expected to decline 5% this year, but output in terms of the won is expected to remain at 20%, while an increase in exports is probable due to the depreciated currency. The private and public software sector is expected to shrink; the release of a Korean version of Windows 98 is not expected to increase PC demand. Korean Electronic Industry Association officials said domestic PC sales fell 39% in the first half of this year, and they fear the domestic PC market will collapse. The number of local manufacturers has fallen from 70 in 1991 to five. Taiwan's PC industry growth is 30 times greater than that of Korea.

"Small IT companies are constantly appearing and disappearing and like the law of the jungle, only the fittest survive," said Koh. "Before IMF, Koreans wanted to buy state-of-the-art technology, and computer and electronics companies could enjoy their behaviour. Since IMF they are much more practical, thinking more of value for money."

The IMF intervention has become a term of reference in Korea, marking a stage in economic growth similar to the end of the Korean War (and the beginning of US investment and a focus on manufacturing) and the end of the military regime (which opened up the country).

Let's hope it is a positive marker in the country's time line.

Unlike other nations where production has come to a halt, Korea still has the feel of a young and upcoming nation. The busy streets of Seoul are packed with well-dressed teens and 20-somethings, and many of the Korean-style buildings remain. New developments continue, both in the capital and along the busy highways leading to outlying regions. It's as if the older generation (and its practices) are almost forgotten.

Selina Mitchell

## TAIWAN: Risky business

**T**here were 7,250 companies represented at the world's largest IT trade fair, CeBIT 98, held earlier this year in Germany. The 670,000 visitors, if they could have roamed all 26 halls, would have come across over 500 companies from Taiwan. The small island country off the Chinese coastline had the largest number of participants from any nation, beating the next nearest rival, the US, by almost 100.

Most visitors to the enormous trade fair would have been surprised to learn of Taiwan's commanding position. The country's exhibits did not dominate the halls. There was none of the froth and ceremony of the two-storey, space-hungry multinationals' efforts staffed by hundreds and blasting out music and multimedia spectacles; instead, they were small and business-focused.

Their low-key but high-volume presence reflects the country's approach to succeeding in the risky IT&T arena. Taiwan's economy relies heavily on small-to-medium enterprises (SMEs). While some multinational IT firms come to mind, such as Acer and Taiwan Semiconductor Manufacturing (TSMC), the bulk of Taiwan's IT business consists of small, flexible firms with niche markets, which are willing to take risks and change tactics to suit demand — a very different setup to Korea's all-encompassing chaebols or Singapore's government-controlled approach.

Taiwan may be small in terms of population and land mass, but it is a giant in terms of its technology influence. It is the world's third-largest hardware producer, behind only the US and Japan, and has become an international sourcing centre for parts and components as well as finished products. Taiwan's four major products (notebooks, desktop PCs, motherboards and monitors) accounted for almost 80% of global IT market share last year, according to Taiwan's Market Intelligence Centre (MIC). Its desktop PC production reached 2.9 million units in the first quarter of this year and almost \$US1.9 billion worth of notebooks were produced for an export market dominated by the US and Japan. Taiwan's shares in the scanner and CD-ROM drive markets are also increasing; hundreds of manufacturing companies are located within a 100km radius of Taipei and Hsinchu Science Park.

So how did this small nation move from being an agricultural economy to a leading IT&T manufacturer? In recent decades it has reacted quickly to shifts in the global economy, said industry representatives. Taiwan started to manufacture textiles, toys and consumer goods, which created economic growth. However, as it developed, it began





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to lose the advantage of being an underdeveloped and therefore cheap country in which to manufacture textiles, making it difficult to compete with neighbouring countries which could offer much lower labour costs and rental prices. "If we didn't upgrade our industry, we could have lost our advantage," said Abraham Lin, project manager for market development with the China External Trade Development Council.

So in the early '80s the reliance of the Taiwanese economy shifted from low-added-value, labour-intensive manufacturing to the more lucrative information industries, predominantly components and PC/notebook hardware

manufacture, said Lin. With the shift came added risk, but Taiwan's entrepreneurial business community did not falter.

"Taiwan is a country of risk-takers," said Henry Yang, director of the economic division of the Taipei Economic and Cultural Office. "We have huge human resources, and they have the right entrepreneurial attitude."

Unlike Malaysia, which is spending millions on marketing its Multimedia Super Corridor to large overseas firms, Taiwan's industry is based on a mass of local SMEs creating small footholds which strive to become multinationals in their own right, said Yang. There is also a highly motivated venture capital industry in Taiwan, which includes high-profile banks. Money is also available from enthusiastic family members and friends willing to take a chance on new ventures. Overseas education is another secret to success, he said. Many Taiwanese students are educated in the US, where they learn the IT development ropes from the leaders in the industry, in both the universities and companies there, and bring the information back to Taiwan to use in local firms, he said.

Sometimes the information comes to them. Multinational companies looking for cheaper manufacturing sites get Taiwanese companies to build their goods for them, and the Taiwanese learn from these experiences, said a representative from one manufacturer, and use the knowledge in their own products. "We are still learning a lot," he said.

The broadly diversified IT&T industry is aided by government-founded and funded organisations, which supply technology and license it out. It does a lot of the expensive research and development groundwork for companies, passing on the information and licences. Labs, for example, develop new products and transfer the technology to private companies. Some of the workers also leave and set up their own businesses based on their research (TSMC was an ITRI spin-off).

The ITRI (Industrial Technology Research Institute), a 6,000-personnel, non-profit R&D organisation, transfers technology to local companies for manufacture. Its latest focus is DVD technology, which it is licensing to Taiwanese companies in an effort to curb a market shortage and Japanese domination of the sector.

The government-sponsored Institute for Information Industry plans everything from large-scale national computerisation projects to market research. The latter is done via the MIC, which provides updates on market and

While some are concerned that Taiwan will become another of Asia's falling dominoes, Taiwan's gutsy nature is of huge benefit to its future economic wellbeing.

industry developments and trends, both domestic and international.

Yang stressed that while the government does play a role, it would be useless without the motivated entrepreneurial people willing to take on the volatile high-tech market. Now there is also the regional economic crisis to contend with.

Taiwan has been relatively sheltered from the region's downturn, but this may not continue. Austrade representatives noted that Taiwan has the world's third-largest currency reserves, the stock market has not had the huge falls seen in other regions, and it does expect growth in GDP this year. However, Austrade said analysts feared the impacts of the crisis would start to be felt later this year or next year. Like Korea, Taiwan is also impacted by falling demand in the semiconductor market. Fabrication plants have cut capital expenditure and production rates. The decline in the global demand for IT products has prompted Taiwan's largest semiconductor manufacturer to cut its budget for new investments in 1998 by almost 30%, said the representatives. Total exports and imports have fallen as the market slows. Electronics companies have retrenched workers or put employee recruitment on hold.

"No-one can claim immunity to the crisis," said Yang. "It is a question of extent. We are affected less severely, with at least 5% growth forecast for this year." Most countries in the region will be lucky to manage growth of 1% or 2%. Due to slow sales in the region, Taiwan's IT companies are moving to establish new markets, particularly in Europe and China.

While some are concerned that Taiwan will become another of Asia's falling dominoes, others are not so pessimistic. In its report *Asian Aftermath: What to do now?*, Gartner Group noted that Taiwan's gutsy nature is of huge benefit to its future economic wellbeing: "Taiwan has smaller and better-run companies, and its huge account surplus will enable it to take advantage of the cheap buys now possible in the region. Taiwan's culture is free-spirited and entrepreneurial, rather than dominated by a top-down government-sanctioned approach. It has considerable money to invest, but has to be cautious and not be seen as gloating or too opportunistic."

Selina Mitchell





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# Hard hit economies

**I**n the same way that the information revolution has meant easier access to global information, and the benefits and problems associated with it, the currency crisis in Asia can be traced back to the days of easier access to global money, according to former Prime Minister and noted Asia watcher Paul Keating. By mid-1997 bank loans to Asia had reached \$US370 billion, and the subsequent region-wide downturn was precipitated by the US dollar's relationship to the yen. The downturn was exacerbated by the ensuing devaluation in the local currencies, vis-a-vis the loan currency, which was invariably US dollars.

While Asia watchers and analysts continue to weigh up influenza over influence, there are some positive aspects already being signposted by the industry at large of the effects of the crisis in the countries with which relationships have been established.

Not surprisingly, these include the creation, by necessity, of attractive manufacturing grounds, and the opportunity to build lasting relationships, founded on good corporate citizenship and the proof of good faith.

Of the economies hardest hit by the currency crisis, Indonesia's situation is the most dire. In economic and social terms the country has been wracked by severe devaluation of the local currency — up to 80% on its value in July last year — and an unemployment rate of nearly 20%. In purely IT spending terms, the small Indonesian market will suffer a greater than 50% reduction in spending, according to a report from industry analyst Gartner Group. Likewise, Thailand and the Philippines, also tiny in terms of IT spending, will experience a reduction of between 20% and 50% of IT for the duration of the crisis/recovery period.

More significant, perhaps, is the equivalent reduction in spending by Korea, since although the reduction is of the same magnitude, it is regarded as a far larger market, and the downturn in consumption will thus have a more significant impact. Likewise, a forecast reduction in spending of a similar proportion in Malaysia signals that behind the MSC's full-steam-ahead rhetoric, there's a growing disquiet about the ongoing effects of the downturn.

In contrast, markets that are small in size and likely to be resilient to the crisis include New Zealand and India, where a slowdown in expenditure of less than 5% is forecast. Larger IT markets which will show similar resilience include Australia, China and Japan.

In countries such as Korea, which Gartner predicts will experience a drop of 30% to 60% in capital spending in the area of semiconductor manufacture, the paramount risk is that there will be a corresponding technology lag, and in that time, market share gains that had been made against the Taiwanese market could be forfeited.

For companies doing business in hard-hit economies, government slowdown in expenditure on the telecommunications infrastructure will no doubt deliver blows in terms of the day-to-day business process, and may necessitate unplanned spending on network infrastructure. Corporate expenditure may have to replace expenditure which, in happier times, might have been invested by governments building a nationwide infrastructure.

Countries which have a workaround, on the other hand, will take these measures rather than spend more money. For example, Hong Kong, which has a communications infrastructure superior to that of greater China, is more likely to become the telecommunications gateway for the country than, say, Shanghai. Prices for carrier and network services in countries with weaker economies may experience sharp rises, in some cases an increase of 50% to 100%, while more resilient countries are likely to be immune.

Economic recovery and the related recommencement of an IT infrastructure policy is inextricably tied to a reform of social, business and financial practices. According to Keating, the most significant effect of the crisis will be to irrevocably change the culture of government-controlled or favoured business dealings, the propping up of unsustainable business deals and schemes, and entrenched administrative corruption and ineptitude. "This isn't just a cyclical economic downturn we are seeing, but a fundamental economic, social, political and strategic shift," he told an audience at the recent HP World conference in Sydney.

At opposite ends of the IT, financial and power spectrum, Indonesia and Japan are equally susceptible, in his view, to the machinations of political persuasion, and recovery is dependent on their ability to break that cycle. For Japan in particular, he said, the way out of current problems is "a complete reform of the political system to dismantle the cosy, amorphous alliance between officials, politicians, bankers and industrialists and to make politicians more accountable to . . . Japanese electors".

Japan's ability to reform and recover is absolutely pivotal to the region's prospects, and despite individual countries' best endeavours, some market analysts are predicting that worse is yet to come. Gartner reports that since much of Japan's financial sector is still largely in denial about the extent of the problem, and entrenched corruption and exposure to financially strapped countries such as Indonesia, the Philippines and Thailand continue, the crisis is definitely a phenomenon of the present, rather than the past.

For vendors wanting to establish or grow existing businesses in hard-hit economies, the curve may be steep but the view from the top eminently worthwhile. While Keating espouses the view that for many in Asia the crisis will only entrench the notion that the Western world is not to







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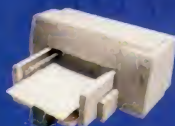
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be trusted, the opposite view, promoted by the Gartner Group, is that the right moves, sensitive investment, and the ability to demonstrate long-term commitment, will all serve the IT industry well.

Investment in local infrastructure, and particularly in local employees rather than shipped-in staff who want to be paid in US dollars or other stronger currencies, represents not only smart economics, but genuine input into the improvement of the local economy.

By doing so, companies will also gain a strategic competitive advantage over those that don't make the investment.

Companies trading only IT products only in hard-hit economies will find life very tough. Companies which spread their investments, either by diversifying in the products they manufacture — a practice perfected by Korean companies — or by spreading investments in more resilient economies such as those of Singapore and China will fare better. Likewise, the Gartner report states, companies that offer products in local currencies will reap a price advantage over products traded in US dollars. Consolidation in the distribution channel will also cause short-term confusion but will bring about streamlining in business practices, which will be of long-term benefit.

Building long-term relationships, and in the process forgoing short-term profits, is critical. "IT suppliers must stick with Asia," the Gartner Group report emphasised. "Enterprises and governments across the region will remember those vendors that were friends during hard times." Now is the time to turn business-partner rhetoric into deeds, it urged, concluding, "Actions by suppliers now will determine winners in any post-crisis recovery."

Companies need to balance the long-term benefits of being in Asia with the short-term reality that there will

"At the broadest level, the crisis is the offspring of the information revolution."

PAUL KEATING

probably be little locally derived profit for some time. Buying out small Asian companies is a way for multinational corporations to reduce competition, and at the same time save local jobs, increase market share and build an ongoing business profile. Likewise, Gartner cautions that companies which have invested substantially might need to weigh up the real likelihood of ever getting their money back, and write off losses, or develop more realistic longer term repayment plans for debtor partners.

'Long term' is a key phrase. Asia represents significant market and manufacturing opportunity for the IT industry, and the current crisis, from which, it must be emphasised, there seems no short-term respite, will force widespread change in all areas of policy, administration and business. Japan's role in the overall health of the region is both critical and uncertain. At the end of the tunnel, though, there is light: when the inevitable business upturn begins, the fight for market share in this potentially enormous market will be fierce, and the current cataclysm offers Australian companies especially a pause in which to consolidate business strategies and cement relationships in the region.

Helen Dancer

## HONG KONG: The tiger's tale



Among Asia's tiger economies, Hong Kong stands out as a model of restraint in terms of government intervention in the affairs of the business sector. Less has always resulted in more for the former Crown colony, which has championed the cause of capitalism and free market forces.

While other economies in the region continued to drag their feet over the pros and cons of opening up their banking sectors, the past British-led administrations helped create a liberal market that encouraged the establishment of a robust banking and financial services infrastructure.

From manufacturing to telecommunications services, to retail and entertainment, Hong Kong made its name as a money-spinner, and Hong Kong-based businesses, backed by a well-heeled financial sector, invested in ventures abroad.

The examples are many. Certain companies owned by Li Kah-hsing, Hong Kong property tycoon and one of the world's wealthiest businessmen, control Orange, the second biggest cellular phone operator in Britain. Australia's Foster's has forged ties with another major Hong Kong property developer, the Wharf Group, that enabled it to get an important foothold in the vast mainland China market for its famous beer.

But something funny happened on the way to cyberspace. It now appears that Hong Kong's entrepreneurs want more, not less, government intervention in matters relating to information technology development. And it looks as though the new government of the Hong Kong Special Administrative Region (SAR) still needs some more time for practice.

Meanwhile, calls are being made for clear and decisive government action by a very concerned local IT sector. Hong Kong's leading Internet service providers last month closed ranks and called on the government to embark on a large initiative that will help further stimulate growth in the nascent Internet market.

In Hong Kong, a city of close to 6.5 million people, there are between 90 and 100 licensed ISPs — the greatest number per capita in the region. "The ISPs have already done a great deal in promoting the use of the Internet. It is time the government took the lead," said Daniel Ng, president of Hong Kong Star Internet and chairperson of the local ISP association.

Ng acknowledged that the government has been conducting a high-profile campaign to encourage schools as well as small to medium enterprises (SMEs) in Hong Kong to adopt the latest advances in IT, including Internet access. He pointed out, however, that there was still plenty that the government could do, such as leading the rollout of new Net activities related to electronic commerce.

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ecommerce arena managed to generate just \$US8.8 million in transactions last year, according to market analyst International Data Corporation. That figure is forecast to reach \$US37.2 million in 1998, despite Asia's lingering economic crisis.

Other ISP officials said that there was a general lack of understanding by the SAR government when dealing with the Internet. HKNet general manager Charles Mok cited as an example the government's drive to provide Internet access to the Hong Kong public school system.

The government's Education Department has already moved to upgrade computer equipment in many public secondary schools. It bought all the necessary hardware and software, but financial resources were not provided specifically to pay for the cost of Internet access. "Currently, there is the expectation that the ISP community should provide free Internet access to all schools," Mok said.

Calls have also been made for the government to be much bolder than it has been in the past with IT spending. "Unlike governments all over the region, which are making investments into building up their IT infrastructure and raising the IT knowledge level of their people, the Hong Kong government has left such things largely to the commercial sector," said Lee Khen-joo, Hong Kong Supernet chief operating officer.

Unlike the governments of Taiwan and Singapore, the SAR government does not promote Hong Kong's advances in IT, said Sin Chung-kai, chairperson of Hong Kong's legislative council panel on IT. He stressed that if the government were to embark on a long-term IT infrastructure development program, Hong Kong would be competitive with other IT centres in the region, such as Singapore.

## Year 2000

A recent survey conducted by a political organisation called the Democratic Alliance for the Betterment of Hong Kong showed how the government has failed to raise wider awareness about the Y2K data change issue.

"We urge the government to coordinate all policy sectors to fight the Y2K problem," said Kan Wing-kay, convenor of the party's IT unit. He pointed out that those facing the threat of destruction posed by the Y2K problem are SMEs, which make up the great majority of businesses in Hong Kong.

Kan, who is also an engineering professor at the Chinese University of Hong Kong, said he believed there was sufficient expertise in Hong Kong to resolve the Y2K issues affecting both hardware and software used in Hong Kong. William Lo, managing director at Hongkong Telecom IMS, the SAR's leading ISP, said the collective hope of the IT sector currently rests on what the recently established Information Technology Policy Bureau will do in the near future.

In spite of all the criticism it has received of late for being conservative, the Hong Kong government has been quietly beating its IT-related problems. Under a five-year plan initiated before the July 1, 1997 transfer of Hong Kong's sovereignty from Britain to China, the government

**The government will develop an open, common-interface information infrastructure throughout the territory.**

upgraded and automated operations in some of its most important agencies, including the Immigration Department and the Internal Revenue body. At the end of that program, significant investments were also made to bolster the IT capabilities of public schools.

In his policy address last October, the SAR government's chief executive Tung Chee-hwa pledged to make Hong Kong a leader in the information world of tomorrow. The government will develop an open, common-interface information infrastructure throughout the territory; promote IT applications using the common interface in the public and private sectors; and commission innovative pilot projects that use the developing infrastructure.

Gary Lai, who works for the secretary for Information, Technology and Broadcasting, said that as a first step towards implementing that pledge, the Information Technology and Broadcasting Bureau was now examining the feasibility of providing ESD, or electronic service delivery, for online access to public services.

Commenting on budget allocation for government-led IT programs, Lai said, "We will be bidding for funds for their implementation in accordance with the usual resource allocation procedures within the government."

KH Lau, director at the Information Technology Services Department (ITSD), which serves as the government's own management information systems group, pointed out that the government had actually been very deliberate in upgrading its IT infrastructure to meet existing demands and spending for the latest technology. The government's networking infrastructure is very similar to those deployed by major corporations worldwide, only on a very large scale.

Lau said that the government has always supported efforts by the private sector to educate and inform the public and raise its awareness concerning major IT issues such as the Y2K problem. Lai told APC that a high-level interdepartmental steering committee has been established to coordinate rectification work within the government and to monitor compliance progress in non-government organisations which provide essential services to the public.

**Bien Perez**







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# Asia's silicon valleys

**T**he race is on to create technology centres of excellence, and to earn a global reputation for them. From the MSC in Malaysia to the Incheon Valley in Korea, Bangalore in India, and as far south as Melbourne and Sydney, governments are striving to attract investments from the multinationals as talismans of capability and promise.

But whatever they are, one thing they are not is west-coast California. And that's something for which they should individually and collectively be thankful, according to Dr Thomas Ng, managing director of TDF Management in Singapore. Only in their differences can they realise their strengths, and only in their complementarity will they succeed.

Up until the very recent past, he said, Asian cities were growing at an "unbelievable" pace. The term 'silicon valleys' has come to symbolise success in high-tech growth and high-tech economies, and each nation had taken it as a matter of national pride to be the first to create a 'silicon valley'.

The economic crisis has given the leaders in the various countries time to pause and reflect on whether their particular silicon valley will deliver the best possible opportunity, and most importantly, whether they will compete with or complement each other.

There's a great deal more to replicating the success experienced by the original Silicon Valley on the west coast of the US than simply creating a lookalike physical infrastructure with lots of tall buildings.

The key factors for success in founding a silicon valley include excellence in education, and the ability to attract entrepreneurs and innovators. It takes a market (with enough cash) to purchase the products, and the underlying environment of a racially tolerant society, to attract the best and retain the brightest. There's also a need to accept failure as a necessary path to success, noted Ng, which is a quality more readily found in the US than in many parts of Asia.

"But note there's not a word about technology so far," Ng said. "Without these other factors, technology alone is a sure path to failure."

Matthias Goertz, a lawyer with Booz Allen & Hamilton in Thailand, concurs with the many-faceted description of what comprises a silicon valley. They are, he said, physical entities, with both hard and soft infrastructure. The 'hard' includes services such as transport and communications, residential and office spaces, as well as recreation and education facilities. The 'soft' encompasses policy, laws and regulations which define the space — in some cases these are just the laws that govern that particular country, but in other cases they may actually be different from the laws and regulations governing the rest of the country.

A country's silicon valley can act as a hub for a virtual community, a kind of wheel whose spokes go out in various directions, like a giant 'server' where things are being stored, produced or transformed — a hub which then feeds information to national, regional or global networks. Addition-

ally, it can be the marketplace for the exchange of ideas, information and services.

Apart from the physical, Goertz said, silicon valleys are also a state of mind. "They have a certain intellectual fabric, they tend to foster entrepreneurialism . . . innovation and experimentation. They tend to have a certain feel to them, a kind of optimism. There's a German word I didn't quite know how to translate, which is *aufbruchstimmung*, which means when you start out on a project there's a kind of excitement in the beginning. Silicon valleys have this kind of excitement."

That excitement is warranted, in terms of potential, said Ng. "In the next millennium, Asian nations are presented with the best opportunities that are available in the information revolution: the digital portion of the economy is going to grow so fast and change so rapidly, it will allow small players in the emerging markets to rise to the top."

Small startups will be the big winners in such an environment, he said, because it has all the elements necessary to allow them "to knock some of the big players off the top". There are plenty of reasons for his assertion.

To capture this phenomenal growth, countries in the Asian region must band together into a single, uniform market.

From Korea to Pakistan, he estimated, there are 500 million potential consumers. The region, he said, can be counted on to sustain 5% growth per year for the next 10 years, even allowing for the current crisis.

But, he added, there's the need to get rid of tariffs and to take measures to strengthen the protection of copyright and intellectual property. The system should be transparent, he said, and there's an imperative for governments to ensure that information and ecommerce can flow freely.

It's also incumbent on each nation, he said, to encourage each of its citizens to become technology literate, and he described this as a much surer path to a successful outcome than the simple building of high-tech buildings.

Because of the diversity of language and culture in the region, he suggested that individual countries would be well advised to give up their language-specific applications and local-oriented content.

The tradition of seafarers building boats in order to sail out and make discoveries and trade is an apt metaphor for cyberspace, he said. In the same way that the seafarers build boats to transcend physical boundaries and pass freely, cybersurfers must find their way clear — linking together is a critical step.

"This might all sound very idealistic, very far-fetched, but the consequences of not working together [will be] great," Ng said.

Chinese dynasties chose to ignore the Western world's advances in the technology of that day — the building of warships — and instead chose to close themselves off against the 'foreign devils', forbidding citizens to trade or communicate with the outside world, he said, and what has happened in Asia over hundreds of years is a direct result of this attitude.



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The next millennium, however, offers the greatest opportunity to level the technology gap, because it is technology which is changing the way we communicate, and will in the very near future change the way we do business.

Goertz observed that the areas that aspire to become the silicon valleys of Asia use different methods to achieve their objectives. "For example, some of them are what I call top-down, others are bottom-up. The top-down ones are characteristically where the government has decided it wants to build a silicon valley. The MSC in Malaysia is a good example of such an approach," he said. "Prime Minister Mahathir created the idea [of] the Multimedia Super Corridor."

Bottom-up are those in which the government doesn't take a major role, where things 'just happen', he said. For instance, in Bangalore, a local software industry started to develop because of a few very good universities which turned out a lot of mathematicians and computer scientists. "There were also some government-sponsored research labs in the region, which helped. One lesson from Bangalore is that it doesn't work completely without government assistance. Bangalore is more a bottom-up model," Goertz said.

He noted that Taiwan's case is interesting in that the government decided to start by giving incentives to Taiwanese who were educated in the US in Silicon Valley, to come back,

have been in a kind of captivity, where local people would buy local brands; but in the case of IT, such captivity hardly exists — customers can be found anywhere in the world and they can be supplied from anywhere in the world.

Companies are also competing for resources, Goertz noted, particularly the limited supply of what he calls 'knowledge workers' — those with the right kind of education to contribute to multimedia and IT services. Increasingly too, such people are highly mobile, so if one country cannot offer them the right kind of opportunity, they will find one that will.

The third critical and contested aspect is international capital. "Investors will always be looking for the best deal, so you're competing for a limited supply of venture capital funding and direct foreign investment by multinationals, as well as local investment from, for example, governments which have certain programs to promote.

"Nevertheless, having said that yes, you're competing, the good news is that the playground in which these nascent silicon valleys are playing is also growing rapidly. While the globalisation and networking of the world increases the competition, it also increases access by each of the silicon valleys to a larger number of customers, suppliers, and so on," Goertz said.

What happens in the process, he said, is an effect which economists call a network of positive externalities comes into play. "If you have a network, like a telephone network,

the value of that network to the user increases with every additional terminal or user connected. [If] you have a telephone [but] have no other person connected, the usefulness of that network is zero. The minute you connect one person, it has some use, and the more people you connect, the more useful it becomes. And it's at no cost to you. If you're a subscriber, adding new users to the network doesn't cost you any money."

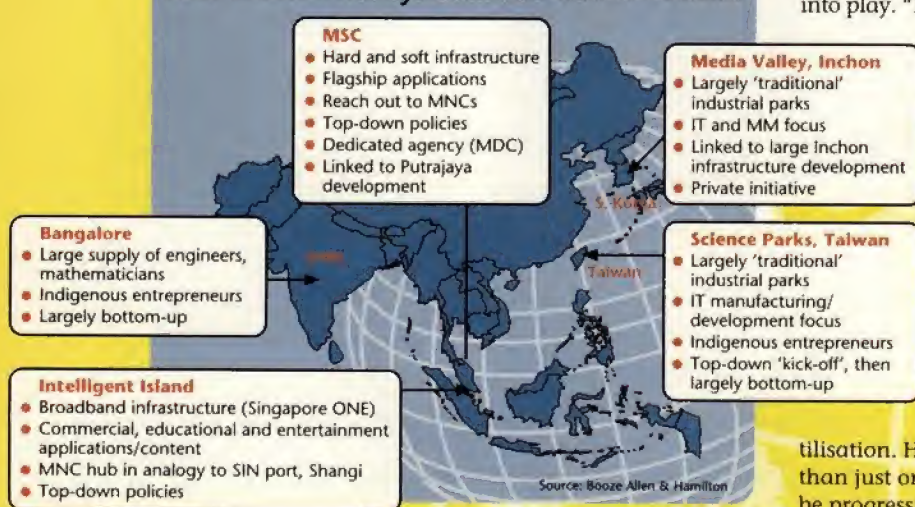
Silicon valleys will be able to network and connect with each other, presenting the opportunity for some of the effects described above to come into play.

The final point is the benefit of cross-fertilisation. Having several silicon valleys in Asia rather than just one means that different fields of endeavour can be progressing in different centres, and the exchange of ideas and people between the various silicon valleys means that everyone will benefit from the cumulative effect of knowledge.

The net result will be to level the playing field, Goertz said. In the past, when countries were able to build local monopolies because knowledge did not travel very far and policy could not be simply adopted elsewhere, different places were characteristically diverse. Such diversity is declining, he said, in that increasingly, countries in the region share a basically capitalist business model, a legal framework for conducting business and, to an extent, a telecommunications infrastructure in which to do business. As each of the countries in the region develops at its own pace and with its own characteristics, the original Silicon Valley will not sustain its advantage of having been there first, and will become no more than just one of the silicon valleys around the world.

**Helen Dancer**

### Asia's silicon valleys come in various shades



settle down in Taiwan, buy a piece of land at a very good price, and become an entrepreneur. Once these people were there it became very much an entrepreneurial environment. So, the government kicked it off, but, he said, it doesn't really meddle with what's going on in these science parks.

Another area of competition is for customers. One of the key groups of customers is multinational corporations, which most of the so-called silicon valleys try to attract. There are only so many multinationals in the IT area, and they only need one Asian base. They can choose whichever one best suits their needs, so each country is competing for them. Singapore in particular has been very good at this, Goertz said, fighting competition from both Malaysia and Korea.

Competition also exists for end users. Increasingly, your end users are not necessarily located in your own country, he said. Traditionally, markets for conventional products





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## INDIA:

## An investment in the future

**T**he conception and design of India's IT industry is sophisticated, particularly in the area of software engineering. This is thanks to the country's excellent university system, which nurtures innovation and produces a high output of skilled graduates — the new economy's 'knowledge workers'.

Nevertheless it is a conundrum. It has the second largest population in the world, a significant proportion of which is still living with scarce recourse to basic necessities. It is incongruous that, as Intel's director of Asia-Pacific business development Tony Jansz estimates, there are 200 million Indians earning at least \$US50,000 a year. Such spending power represents an enormous and potent market opportunity, far greater than the US, which is often regarded as the benchmark for IT consumption patterns.

The university system has nurtured a quasi silicon valley system in which software design excellence has flourished, without there necessarily being an end goal. The illustration below shows the number of centres of technology design in India, a keiretsu movement which is now being fostered, bureaucracy notwithstanding, by the creation of a structured STP (Software Technology Park),

EHTP (Electronic Hardware Technology Park) infrastructure, and the development of financial incentives and tax breaks for centres which develop export units.

Multinationals have been quick to capitalise on the expertise in these technology parks. Notable companies, including Microsoft, Hewlett-Packard, Intel, IBM, Baan, and more recently, Oracle, have made substantial investments in R&D in the country, often associated with existing university centres.

India is cited by Booz Allen & Hamilton's Matthias Goertz as being unusual in its gleaning and exploitation of technology wisdom because of this very 'bottom-up' model (see previous page). Malaysia and Singapore have driven technology parks from government level down, the government investing in infrastructure and training, improving computer literacy among the population and partnering with multinationals with particular skills. India, on the other hand, has invested in pure science, and has produced knowledge workers and innovation as by-products. On top of this purely intellectual framework, the government has recently made provisions to reward those endeavours which generate revenue as exports.

Such provisions distinguish between projects involving foreign capital and those which are domestic, although 100% foreign investment is permitted. Imports related to projects are exempt from import duties, and domestic purchases are also excise-exempt. There are also generous concessions available for companies in their early years on tax, the lease of land and construction of factories, but these are weighed against export obligations — quotas which must be met to stay eligible for such concessions.

For multinationals seeking markets, the outlook is positive. John Boughton, Lexmark's South Asia president, said that, particularly given the economic downturn in countries like Indonesia, PC vendors have turned to India and China as market opportunities.

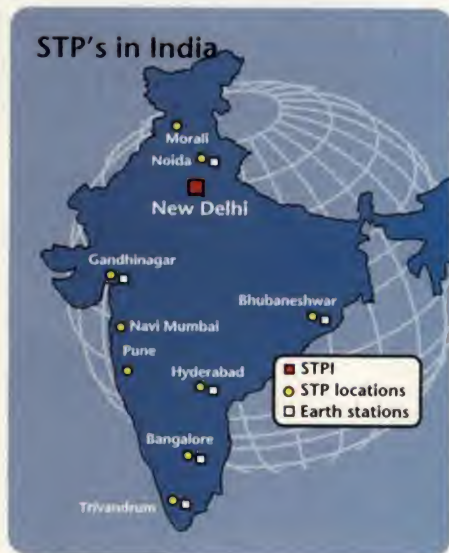
On the Internet front, the outlook is also positive. India held its first Internet World conference in August this year, at a time when the government was reconsidering its monopoly on Internet access provision in an attempt to grow the sluggish market for people wanting to get online. So far only 150,000 users have joined up in the past three years, whereas Internet observers in India estimate that with competition, that number could grow to 1.5 million in the coming three years. ISPs should be allowed to have their own international gateways and should not pay licence fees, according to a taskforce reporting into the way forward for the Internet in India.

The taskforce recommended 108 measures that could go towards making India a computer superpower by 2008, and forecast that it was capable of generating annual exports of \$US50 billion a year, compared to an estimated \$US1.8 billion expected for the 1997/98 year (calculated from April to March). A key component to the success of the project would be to connect each school, hospital, and university, the taskforce recommended.

A skilled workforce, an enormous potential market, substantial investments from multinational hardware and software vendors and apparent government will to equip the population with Internet skills and infrastructure sounds like an ideal melting pot. Nevertheless, *The Economist* has labelled India as "indecisive", the government is yet to clearly articulate IT policy, and indicators point to a long gestation period for India's technological evolution.

Gartner Group forecasts long-term significant success, however, and says that despite infrastructure limitations, software exports, which may well reach \$US3 billion by 2000, will continue to boom. The danger, as Goertz explained, is in the mobility of the workforce: the IT environment in each of the surrounding countries in the region means that there will be attractive employment opportunities elsewhere, notably here in Australia, and there will be plenty of competition for India's knowledge workers. Indian organisations or universities should not assume that because they have nurtured this talent pool it will necessarily stay in the country, he said.

**Helen Dancer**





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# Bigger, better, brighter, faster

**F**or many people, the biggest advantage of MMX was the larger level 1 cache that was integrated into the new processors. At the time, Intel was showing off some pretty impressive demos, but the effects have not translated into significant real-world performance gains.

The concept behind MMX is sound, even if its implementation was not the best. To be fair to Intel, at the time it would have been hard to anticipate the explosive demand for 3D graphics on PCs — and MMX is just not much use when it comes to 3D graphics.

As a result, three of the major CPU vendors have spent the last year or so scrambling to come up with the best solution for delivering 3D graphics to the desktop. In the end, their implementations are different, although they do share commonalities: most notably the use of single instruction, multiple data (SIMD) instructions.

The key problem is the way the 3D graphics pipeline is structured; typically, the CPU sets up geometry — the location and shape of the polygons in the scene — while the graphics card takes care of the rendering, texturisation and possibly the triangulation of the polygons. While graphics card vendors have done an admirable job in the latter, the former has proven to be the bottleneck in many cases.

Geometry setup is not a trivial task. Starting with a 3D virtual space, in which vertices have absolute coordinates, the computer has to 'transform' the location of the vertices to take into account the position of the viewer. When a character in a 3D game walks forward, for instance, all the vertices that make up the polygons in the scene are actually being moved 'towards' the screen. It sounds simple, but it's not.

Perspective has to be taken into account, as well as the size of the viewport (the screen), clipping, and a whole host of other factors. To perform what is called a 'vertex transformation' (that is, determining the location of the vertex on the screen, as opposed to its absolute location in the virtual space), a 4 by 4 matrix is typically used to calculate the location of the vertex — requiring 14 multiplications, 12 additions and one reciprocal value to be sought. Given there can be thousands of vertices within a frame, there's a lot of calculation to be done. To get decent frame rates, you have

to do all those calculations many times per second.

Fortunately, the repetitive nature of this calculation (you have to do all the same calculations over again for each vertex) makes it an ideal target for parallelism. This is where the new multimedia instruction sets come into play. Those proffered by Intel, AMD and Motorola are simply tools to introduce SIMD features to their processors to enable this kind of parallelism.

SIMD instructions, put simply, enable the developer to issue a single instruction which is applied equally to a group of values stored in one or more registers. The results of this instruction are calculated in parallel for all the data elements, providing high levels of efficiency.

## Register 1

Bits in register	0-15	16-31	32-47	48-63
Contents	Data A	Data B	Data C	Data D

## Register 2

Bits in register	0-15	16-31	32-47	48-63
Contents	Data E	Data F	Data G	Data H

*SIMD operation: multiply content of register 1 by register 2  
put contents in register 3*

## Register 3

Bits in register	0-15	16-31	32-47	48-63
Contents	Result AE	Result BF	Result CG	Result DH

The above table shows an example of a SIMD operation, in which registers 1 and 2, 64-bit registers with four 16-bit values packed in them (as opposed to the single value normally found in registers) have a SIMD instruction to multiply on them. The results are stored in register 3. In this case it executes four multiply operations in the time it would normally take to execute one.

It's exactly what MMX does, except MMX only performs this kind of operation on integers, and for geometry operations, you really need high-precision and fractional numbers, the kind that only floating-point values provide. This is the reason why MMX, being an integer-only technology, failed to provide a solution for speeding up 3D geometry.

Of course, 3D geometry is not the only area in which SIMD floating-point instruction could come in handy. Many other areas of 3D graphics could take advantage of the instructions: clipping, lighting, physics modelling, animation

and so forth could take advantage of FP SIMD operations, as could some areas unrelated to 3D graphics, such as software modems, video, speech recognition and audio.

As with all new instructions, however, the software is required to explicitly take advantage of the instructions. Older software will continue to use older instructions, ignoring the newer, more elegant and efficient instructions available to it.

This is why processor manufacturers developing these new instruction sets are working with software vendors to have their sets supported. In most cases, this entails working with key 'engine' suppliers, such as Microsoft with Direct3D, or Apple with QuickTime.

The performance improvement, of course, only applies when there is clear potential for parallelism. Just because operations can theoretically be executed four, eight or even 16 at a time doesn't mean you'll get a general system performance improvement of 4x, 8x or 16x.

It would seem all the major vendors of processors for desktop PCs have discovered the need for SIMD instructions for floating-point operations. AMD has already released its K6-2 processor with its 21 new 3DNow instructions; Intel plans to incorporate 70 new instructions in next year's release of the Katmai processor; and Motorola plans to add 162 instructions for SIMD operations to the PowerPC processor via its AltiVec technology.

Given its previous lack of SIMD instructions, even for integer operations, AltiVec represents a radical change to the Motorola's architecture. Rather than taking the two-tiered approach — integer then floating point — Motorola is integrating support for both data types together in a single unit.

A number of new registers will appear in this new instruction unit — 32 to be exact. Each register will be 128 bits long, providing support for packed operation on the following data types:

- 16 8-bit integer elements.
- eight 16-bit integer elements.
- four 32-bit integer or floating-point elements.

For integer types especially, AltiVec is clearly superior to MMX, which only sup-



ports half the level of parallelism AltiVec does, because of its smaller register length (64 bits). As a result, integer operations can potentially be improved by up to 16 times with 8-bit elements, suiting image and video editing.

The floating-point advantage of AltiVec is less pronounced, with support for only 32-bit IEEE floating-point numbers (single precision) — in spite of the potential to use the large registers to perform packed operations on two double-precision floating-point numbers.

AMD and Intel already support packed operations on integer data types with their integrated MMX technology. Realising the need for support of floating-point operations, both embarked on development efforts to find the best solution to deliver cutting-edge geometry processing.

AMD released its product first; 3DNow technology is already shipping with K6-2 processors. 3DNow seems to be essentially a superscalar and functional extension of the MMX architecture. The first thing AMD did was add an extra MMX instruction unit to the processor, then it enabled the instruction units to handle packed opera-

tions on IEEE 754 (32-bit) single-precision floating-point values stored in the 64-bit MMX registers.

This gives the equation: two values per MMX register, two MMX execution units = a theoretical ability to perform four FP instructions in parallel.

The big problem for AMD is the introduction of Intel's Katmai New Instructions (KNI, also known as MMX2), which will inevitably alter the landscape of multimedia instruction sets in the x86, and force AMD to make some tough choices.

The general consensus is that KNI will be a superior implementation of SIMD execution than 3DNow. Given the greater number of new instructions (70 in all), it would appear logical that KNI will support more data types than the single-precision floating-point values supported by 3DNow, and perhaps some extra types of operations. While the practical benefits of this are unclear, it is clear that Katmai will quickly become the dominant standard.

It seems likely that a significant chunk of new registers will appear along with the new instructions. It is unlikely these will be

part of the floating-point unit, as was the case with MMX. The length of these registers is only a guess at this stage — although 128 bits and 40 bytes have both been rumoured. If the former is the case, then Katmai is unlikely to provide a significant performance boost over 3DNow (which can also execute four single-precision operations in a single cycle) for most operations, unless Intel implements multiple KNI units. The latter would provide a significant jump in performance and allow matrix transformations in only a few cycles.

Even if there were not some opcode overlap, or other feature of KNI which prevents it from coexisting with 3DNow, it would be highly redundant to have both instruction sets supported in a given processor. With Intel's dominant position in the processor marketplace, AMD and Cyrix will be left with a serious dilemma when Katmai hits the market: continue to plug away with 3DNow, or cave and license KNI, putting them back in the same position they've always been in — technology followers rather than leaders.

Nathan Taylor

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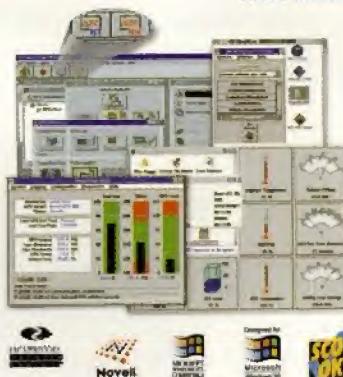


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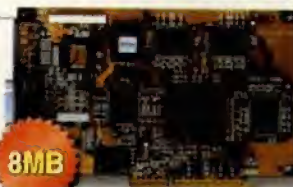
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*Suites have advanced considerably over the past five years, although perhaps not as far as you might have imagined. By Stephen Withers*

## The right stuff

**T**he office suite has become a near ubiquitous feature of desktop and notebook computing for several reasons. For starters, mid-'90s downsizing means secretarial support is a thing of the past for professional and technical staff in many organisations. And aggressive pricing means that suites sell for less than the price of just a couple of their components — maybe you only want the word processor and spreadsheet, but why pay more for less? Plus, corporate IS staff like to standardise to reduce support costs, and choosing a suite is easier than mixing and matching individual applications. There are other reasons, of course, but these examples show that a variety of factors are involved.

Just what is an office suite? Basically, it's a collection of programs covering the common personal computing tasks, typically word processing, spreadsheet, graphics and database work. One application may cover multiple functions; for example charting and low-end database tasks may be performed with the spreadsheet component.

Modern office suites are remarkably good value for money. In 1992, suites cost about \$750, more than those reviewed here despite substantial improvements in capability and usability. Furthermore, it isn't unusual for suites — especially Lotus SmartSuite or Microsoft Office — to be bundled with new computers. While no aggregate sales figures are available for Australia, it is widely accepted that Microsoft has an overwhelming market share. Fortunately for other vendors, the market is so large that even a relatively small share can be worthwhile.

One of the significant improvements in office suites is increased consistency across the components. This may be seen in aspects such as the arrangement of menus, and the design and placement of toolbars and buttons. Developers of non-office suites (such as Macromedia with its graphics and multimedia suites) are also



producing more consistent interfaces, and some specialist programs (some Micrografx products, for example) have a similar look and feel to Microsoft Office.

But there are also downsides. You could be excused for thinking it was compulsory to include a PowerPoint (or equivalent) slideshow in every meeting or presentation. The correct use of visual aids does help get a message across, but it's hard not to wonder how much time is wasted creating slideshows, and how much difference they make to audiences. Some of the most effective speakers I've seen, including Edward de Bono, work with an overhead projector, a couple of textas and several metres of blank acetate film. I'm not yet convinced that the rest of us haven't been suckered into a presentation arms race.

Furthermore, suites are perhaps the outstanding example of bloatware, requiring well over 100M of disk space or compromised performance if you leave some files on the CD-ROM.

Creeping featuritis, in the sense of adding one more dashed line pattern in a drawing program or offering a toolbar equivalent for every menu command, isn't the only reason suites are becoming

larger. Networking — initially LANs and more recently the Internet — has led to completely new capabilities. Some require relatively little code, such as the ability to send the current document as an attachment to an email message; others are more complex, such as converting a document to HTML or some other Internet-ready format. And when a vendor chooses to add a whole new application — a Web browser or email client, perhaps — the total suite size is bound to grow.

Another recent focus is on providing more templates to help users achieve professional results. The downside is that the amount of disk space required grows even further and there is a tendency for everyone's documents to look similar. If you're not up to designing from scratch, try varying a colour scheme or font selection — just think about why the original choices were made.

Intranet and Internet-related functions — hyperlinks, HTML support (soon to be extended to XML), automatically grabbing information from the Web, and opening and saving files directly from and to HTTP and FTP servers — are increasingly being integrated, and this trend is likely to continue.



## WordPerfect Suite 8 with Dragon NaturallySpeaking

### COREL

Corel's suite contains an interesting selection of components with diverse pedigrees. WordPerfect came to Corel via Novell. It took over from WordStar as the pre-eminent word processor following the switch from CP/M to MS-DOS, and has in turn been supplanted by Microsoft Word. Nevertheless, WordPerfect has retained a loyal following, especially in organisations which have invested heavily in macro creation.

WordPerfect 8 provides some of the features that Word 97 users have become used to, such as on-the-fly spelling and grammar checking. Internet support has been strengthened, with automatic hyperlink creation when the most common types of URL are typed (you can also set up short cuts, so typing '@APC' enters the text 'APC' with a hyperlink to <http://apcmag.com>) and provision for HTML forms elements. WordPerfect 8 also lets you toggle between word processing and browser views of the current document, independently of saving it as an HTML file.

The context-sensitive Property toolbar simplifies several common formatting and editing tasks. To give just a couple of examples beyond the usual font, size and style commands, one button provides a pop-up menu for 16 common symbols that don't appear on the keyboard (with quick access to others), and another pop-up menu gives synonyms or spelling corrections for the word at the insertion point.

The Shadow Cursor is another nice touch: point and click anywhere within the page margins and you can start typing or insert a graphic, even if it is below the current end of text — much more convenient than typing multiple Return or Tab characters.

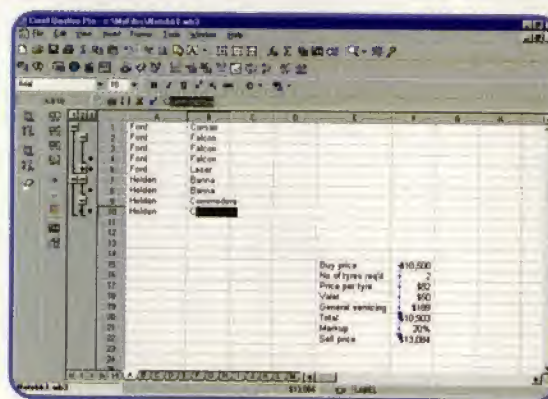
Quattro Pro, the suite's spreadsheet, has a variety of new features, mainly in the areas of styling and checking. In page view, you can adjust margins by dragging them just as you alter cell widths and heights, and change the font, size and style in headers and footers. Cells are edited in place, and the contents can be styled much like word-processed text, with multiple fonts, sizes and styles including superscripts, subscripts and strikethroughs. Styling can be copied from one cell to others with the Quick Format tool. When entering text, Quattro auto-completes entries based on the contents of other cells in the same column (see selected cell in picture).

If you need to monitor a key value in a large spreadsheet, simply drag its cell to the application bar at the bottom of the

window and it will be permanently displayed until another cell is dropped in. Another handy feature is that when a row or column of figures is selected, summary statistics are shown in the application bar.

Sometimes, a more complex series of relationships must be checked. One cell is derived from another, which is calculated from a third, and so on. Quattro can graphically display such links by drawing arrows between cells.

A common problem when modifying a spreadsheet is that a relative reference to a cell is used when an absolute reference



would be more appropriate (for example, to a cell containing an exchange rate). When a formula is pasted or filled into a new cell, Quattro 8 offers to adjust likely references of this kind.

The maximum spreadsheet size is 8,192 rows by 256 columns. The scroll bars do not drag to these limits, but to the most south-easterly cell containing a value (or, in small sheets, so that J30 is at the top left-hand corner).

A good range of chart types is offered, including maps. When a set of labels matches predefined geographic areas such as countries, Australian states (look out for the Australian Capital Territory) or Japanese prefectures, a wizard generates a map coloured and patterned to show one or two data sets. This is fine for showing regions with similar figures, but not when you need to see the magnitude and direction of the differences.

Corel Presentations is a full-featured presentation program. A good selection of templates is provided, along with a variety of transitions and animation effects. The tabbed interface is especially convenient for switching between the outliner, slide editor and slide sorter. The QuickPlay tab means a slideshow can be run with a single click.

Although the program has its own outliner, outlines can be exchanged with WordPerfect. Either approach makes it quicker

and easier to produce a structured presentation. Talking of structure, the Custom Audiences feature means you can tailor one presentation for different audiences, perhaps replacing a series of slides showing financial information with a summary slide.

CorelCentral is a PIM integrated with Netscape Communicator. It provides personal and group calendars and schedules, an address book, card files (predefined files include wedding anniversary gifts, and so on), as well as the usual Communicator features. Just click on an entry's phone number, email address or URL to dial, create a message or open a Web page.

The Address Book application shares data with CorelCentral, but is limited to the entry and modification of contact records, and dialling via the modem. WordPerfect can pick up an address from the address book.

The general suite features are well integrated with the major components including Presentations. TextArt (2D and 3D text effects including warps, bevels and lighting) and the Equation Editor are accessible from the tool-

bar and drop their results straight onto the current slide. Similarly, Corel Versions lets you save and retrieve multiple versions of a document. Limits can be set on the number of versions saved, and particular versions can be made permanent. The Scrapbook provides a suite-wide holder for graphic elements as well as access to the clip-art collection provided on the CD-ROM.

Corel Photo House is a handy program for modifying bitmapped images such as scanned or digital photographs, or for converting between file formats such as TIFF, PNG and JPEG.

The Grolier Multimedia Encyclopedia presents a variety of nicely interlinked material with the usual mix of text, pictures and video clips. In terms of local content, we found cricket but not Don Bradman, rugby league (a passing mention) but not Australian Rules, and prime ministers aplenty.

If you've seen any of Corel's products, you'll know what to expect from the clip art. Over 12,000 items are drawn from a variety of categories and styles, and there's a small selection of photos, backgrounds and textures. The "1,000+" fonts provide a useful selection of body and display faces, and tips are offered. A useful range of templates are also included.

Even though WPS adds its own hierarchical menu to the top of the Start menu,

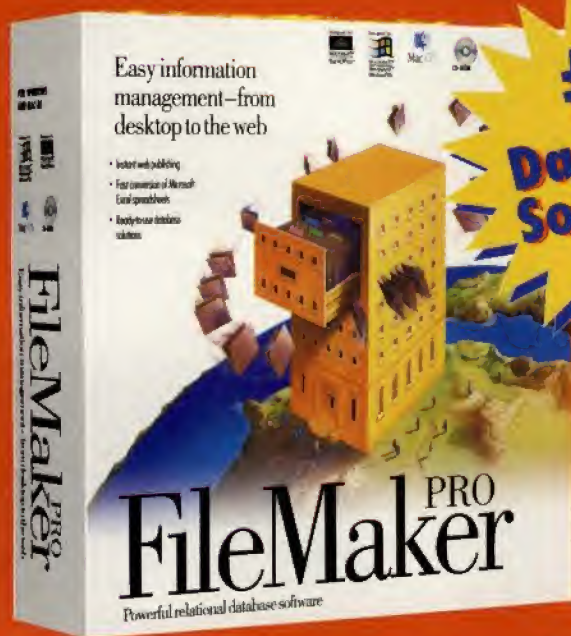


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DAD (Desktop Applications Director) also provides quick access to the suite's components from the system tray. Applications can be added to or removed from the tray.

Other odds and ends include the Envoy 7 viewer (a portable document format similar in concept to Adobe Acrobat) and the Barista printer driver (which creates a Java applet that renders an image with a high degree of fidelity to the original document). The latter generally worked well with our documents, but not with the default path settings.

WPS's documentation is relatively good. The User's Guide covers WordPerfect, Quattro Pro and Presentations (plus some of the minor apps) and is generally task oriented. It is supplemented by a separate guide to CorelCentral and a clip-art and font catalogue. Extensive electronic documentation (including all the major applications plus coverage of SGML features and merge programming) is provided in Envoy format. One problem is that many features of the programs are not readily apparent in use, and we suspect users are less likely to discover them in electronic documentation. For example, Presentation's ability to resample bitmaps (to reduce the file size when a bitmap is shrunk or to reduce the 'jaggies' when it is enlarged) isn't mentioned in the user's guide, though it is in the (electronic) Presentations guide. A printed PerfectScript guide would be very useful.

Dragon NaturallySpeaking is supposed to provide WordPerfect with continuous speech dictation and voice control, but it repeatedly froze during the training process. This did not happen during our review of the standalone product (See APC July 1998, page 40), and we were unable to find the cause of the problem. An appropriate headset microphone is provided with the suite.

WordPerfect Suite 8 is also available in a Professional edition (\$699), which adds the Paradox database software, TimeLine (project management), Web.SiteBuilder and the deluxe version of Grolier's, but excludes NaturallySpeaking.

**Stephen Withers**

- **Distributor** Corel
- **Phone** 1800 658 850
- **Online** <http://www.corel.com/>
- **Price** \$699; upgrade price \$299; full product without NaturallySpeaking \$599
- **In short** Powerful word processor, but lacks a database.

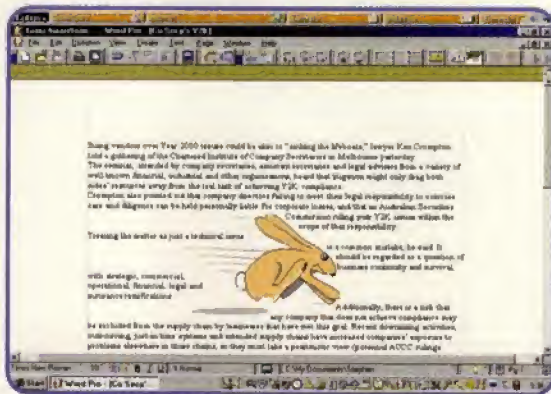
## SmartSuite Millennium Edition

LOTUS

For many users, Lotus 1-2-3 was the reason to replace an Apple II or other 8-bit computer with an IBM PC or clone. Fifteen years later, 1-2-3 — now at Release 9 — is part of SmartSuite Millennium Edition.

A major focus of the suite is Internet integration, and the highlights of 1-2-3 in this area are Web tables and HTML and jDoc output.

Web tables provide a mechanism for automatically retrieving data from Web pages and adding it to a spreadsheet. An obvious example is to calculate the value of a portfolio by collecting share prices from a service such as quote.com, but



other possibilities include aggregating data held on an intranet. Web tables take a URL and retrieve the non-graphic elements into an area of the spreadsheet. Individual items can then be referenced as cells in the normal way.

Net-It Software's jDoc, an equivalent of Corel's Barista, is included with SmartSuite to give 'high-fidelity' Web output. The results of our trials were good with 1-2-3, but mixed when we tried word-processed documents incorporating graphics: Barista more accurately maintained the layout, but jDoc got the fonts right.

1-2-3's auto-completion feature is based on built-in series (such as months) and custom lists, which could be very handy if you always show departments in a particular order, for example. Another time saver is the ability to automatically apply particular formulas such as @SUM or @AVG to a range by typing an appropriate label. Synonyms are supported, and custom functions can be defined and associated with a label.

Like Quattro, 1-2-3 can present geographical data (for example, sales by country) as a map, but does not know



Given that we compared two recently released suites and one that was in beta, we didn't deem it appropriate to select an Editor's Choice.

To some extent, most users have little or no choice about which suite they use. In a corporate or educational environment, the choice will be made centrally; in small businesses or home situations the widespread practice of bundling a suite — notably Microsoft Office or Lotus SmartSuite — means a de facto decision is made for them by the PC vendor. That is not to say, however, that there is *never* a choice, or that it is not important to know the strengths of the various packages if you're entering the market. While we can make some broad observations, we cannot consider every possible requirement. Nor do we believe the product with the largest feature set is necessarily the best.

Corel WordPerfect Suite 8 has a strong word processor and a useful bitmapped graphics editor, but lacks a database. Inclusion of a good selection of fonts and clip media plus an encyclopedia make it particularly attractive to the SOHO market.

Lotus SmartSuite Millennium Edition has a solid spreadsheet, but Word Pro seemed the weakest of the three word processors. FastSite's ability to easily create a Web site from a heterogeneous collection of documents is a plus for some, as is the suite's integration with Notes and Domino, and with IBM enterprise products such as DB2.

Microsoft Office 2000 has groupware features that none of the other suites possess to any degree, and will be ideal for group collaboration when it is released next year. Its set of applications is excellent, although it works best when installed in an environment where other Microsoft products are dominant, just as SmartSuite works best in a Notes environment. A very polished suite overall.



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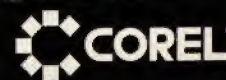
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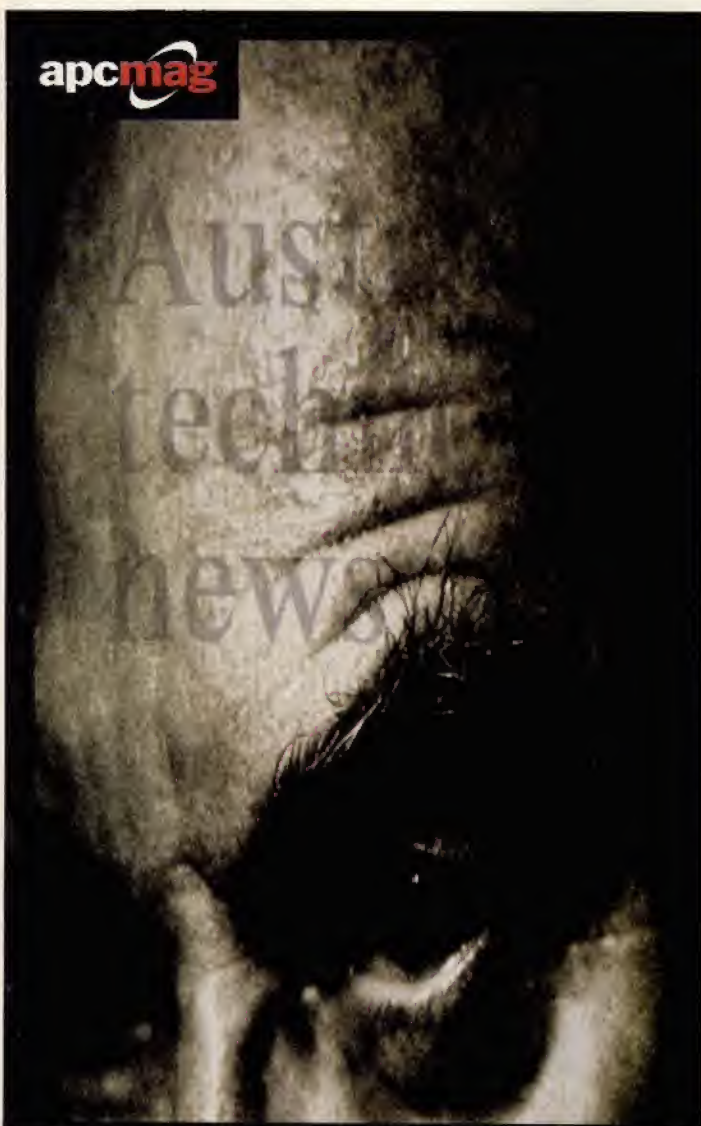


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The maximum size of a 1-2-3 spreadsheet is now 65,536 rows and 256 columns. It's questionable whether a spreadsheet is an appropriate tool for manipulating that much data, but it is the application with which many people feel most comfortable.

Word Pro, the Lotus word processor, lacks some of the features we have become accustomed to, notably background spelling and grammar checking, although automatic correction for common typos is provided. That feature is also used to create hyperlinks from URLs, but we found only Web URLs were recognised, and even then some were missed.

Some of the tools seem pointless, in particular the one that cycles through the available fonts. Surely a WYSIWYG font menu is a more efficient and useful approach.

'Round trip' file compatibility is a good idea: open a file created by another application, and SmartSuite should remember the format and default to it when the file is closed. While we successfully opened Word 97 documents, the Save dialog defaulted to Word Pro. (Excel files opened in 1-2-3 worked as described.)

Although Word Pro now allows text to wrap around irregular graphics, the results were not what we expected. Instead of wrapping around the graphic on both sides, any particular line of text fell either to the left or the right of it (see picture).

Freelance Graphics has the appearance of a presentation program, but also produces line, bar, organisation and other charts. Data can be entered and modified in a spreadsheet-like table (or an outliner for org charts), and the results are generally attractive and uncluttered. A selection of templates is provided for specific types of presentation such as business plans and team meetings, and

a variety of 'looks' can be applied and changed as desired. The usual graphic elements can be added to a diagram, and there's a fair range of clip art as well as some ready-made diagrams. The ability to create a single file containing presentation and run-time code is a plus.

Freelance has a convenient tabbed interface, but some commands are strangely placed on menus. For example, the command to rotate an object sometimes appears under Group and sometimes under Drawing.

FastSite provides SmartSuite users with a quick and easy way of preparing multiple files for publication on a Web server. Intended mainly for intranet applications, it could also be useful for low-end Internet publishing.

FastSite turns one or more 1-2-3, Word Pro, Freelance or Approach files (in any combination) into equivalent HTML or jDoc files, and builds a home page to link them all. The resulting site has a consistent layout (subject to the documents themselves) and navigation icons. Links to the original SmartSuite documents can be included, and non-SmartSuite files published in their native format.

When documents are added to the site, or existing ones edited, FastSite is smart enough to offer to refresh only the affected pages. A variety of colour schemes and icon styles are provided; changing the 'look' requires all pages to be regenerated.

Organizer is SmartSuite's PIM component. It has an attractive interface modelled on those popular loose-leaf planner/diaries, and provides features such as calendar/diary, to-do list and year planner. The tabbed interface is ideal for this type of application, but once you get beyond page-turning the initial attraction fades. To dial a phone number, you must drag the



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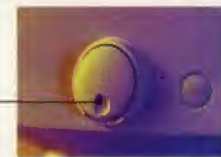
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appropriate 'card' onto the Dial button, whereas CorelCentral lets you dial by clicking a number.

The EasyClip utility is supposed to make it easier to transfer data into Organizer, but it isn't smart enough to parse the data properly. Say you receive an email suggesting 'lunch at 1:00' — you have to tell EasyClip that this is an appointment, and even then it can't recognise '1:00' as a time. Even the original (and maligned) Apple Newton could do better. With addresses, the 'Australian' format fails to separate postcodes from states, leaving it to the user to drag the postcode into the right field.

The approach seems typical of current end-user database packages. If none of the templates are suitable for a project it isn't hard to start from scratch — just define the fields (including validation rules if required) and lay out the forms. Linking multiple databases is no problem either: simply drag a connecting line between the corresponding fields.

Unfortunately, there seems to be no direct way of mail merging names and addresses from a database into a Word Pro document without exporting them to an intermediate file, although an equivalent process could probably be programmed in LotusScript. At least it's easy to copy and paste a name and address record from Organizer into Word Pro.

IBM's ViaVoice Gold is integrated with Word Pro for dictation, and some voice-enabled 1-2-3 templates are available. Despite completing the training process, we did not get reliable recognition. Unlike Corel, Lotus chose not to provide a microphone with the package. The text-to-speech conversion worked well and was generally intelligible.

SmartCenter puts an extra toolbar at the top or bottom of the screen for quick access to SmartSuite and Internet resources, using a filing cabinet metaphor

— complete with sound effects. For some reason the SmartSuite applications folder was empty, but it would have been easy to place short cuts to the programs into the corresponding Windows folder. If you monitor particular news pages or stock quotations, SmartCenter is convenient, especially as its windows can be maximised. Otherwise you may begrudge the (admittedly small) space it occupies, as the applications can be opened from the Start menu or system tray, and the other features are accessible from within the apps or from a browser.

Two of the drawers give quick access to Organizer address book and calendar entries. Unfortunately, the button for creating a letter to the selected contact generated a script error and the dial button had no effect, but the email button worked.

SmartSuite also includes ScreenCam (a screen recorder utility) and the Lotus Mail email client.

The suite's printed documentation is sparse: three thin booklets and a quick reference card. Electronic manuals (in PDF format) duplicate most of the paper documentation and add extensive Approach and Organizer manuals, plus the LotusScript programmers guide. The online help is quite comprehensive. This collection might be appropriate to accompany a 'licence pack', but we believe more extensive paper documentation would give users a better idea of the capabilities of the suite. Fortunately, purchasers will receive a copy of *SmartSuite for Dummies*, possibly as a registration incentive. As it is, the lack of printed documentation is a major weakness.

**Stephen Withers**

■ Distributor	Lotus
■ Phone	(02) 9350 7700
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■ In short Good network support, but poorly documented.

## Office 2000

MICROSOFT

Office suites have typically been seen as tools for personal productivity. In the past, integration with groupware, Web and messaging applications has been superficial at best, mostly evidenced in the distribution of some kind of email package and Web browser with the suite, and perhaps some vague links with some of the suite vendor's other products, as has been evidenced in SmartSuite 97 and beyond.

The new office suite from Microsoft, Office 2000, is looking at changing all that with a host of new features targeted at collaboration and document publishing across an intranet. That being said, the new components of Office 2000 probably fall into that 80% of features that 80% of people never use. If you're an individual user, only interested in the base functionality of perhaps Word and Excel, this suite is not going to offer you much that Office 97 doesn't. Organisations interested in workflow and group publishing practices, however, will find a number of benefits in the new suite.

Consisting of Word, Excel, PowerPoint, Access and Outlook, Office 2000 (formerly known as Office 9.x) will sport new versions of each of these products. We managed to get our hands on Beta 1, which lacks Outlook 2000 (it still has the recently released Outlook 98), but otherwise has many of the new features which are slated to appear in the suite when it is released early next year. Some of these features may change, others may disappear, depending on how Microsoft's beta testing period goes.

The most important new features of the suite are not application specific, but are overall design changes. In line with its current Internet kick, all the applications now



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look quite a bit like Internet Explorer, with the same sliding and dockable toolbars, and similar widget styles.

Probably the key differentiator between Office 2000 and other office suites is the new default file format: XML. Documents created in Office use XML to store edit-state information, while HTML tags are used to display information. This means that any document created in Office 2000 will be viewable within a Web browser, which makes for easy publishing of documents across an intranet. Other suites can do this, but they cannot round-trip the documents as Office 2000 can — the XML tags (which are ignored by most Web browsers) allow document attributes which HTML cannot retain to be stored within the file. An Excel sheet, for instance, when viewed in a Web browser would look like a static HTML table, but retains all the equations and information when opened again in Excel.

Numerous other tweaks have been incorporated into the whole package as well, including dynamic language switching, an improved 'Save as' dialog, a unified Visual Basic for Application (VBA) 6.0 development environment, insertion of discussion threads within Office and HTML documents (even documents stored on Internet Web servers) for small group collaboration, and a very cool 'collect and paste' feature. The latter allows users to add multiple items to the clipboard, and to paste them individually or together.

The use of the discussion threads in documents requires Office Server Extensions, only available for Windows NT. These allow threads to be tracked and the data stored. The server extensions also add support for a feature called 'Document Subscriptions', which help a user track when and by whom a document has been modified. Office 2000 is the only suite to use server extensions.

## Other suites, other platforms

Although office suites for Windows get the most attention, they are also available for other platforms.

For instance, **Microsoft Office 98 Macintosh Edition** combines Word, Excel, Outlook Express and PowerPoint. There is no database component, and reportedly Microsoft has no plans to add one. Available only for PowerPC-based systems, Office 98 is otherwise generally equivalent to Office 97 for Windows with a few variations, including a distinctly Mac-like appearance — a change widely welcomed by users.

**ClarisWorks Office** is a popular program among Mac users, and since Version 5.0, both Mac and Windows versions have shipped on the same CD-ROM. Despite an imminent name change to AppleWorks (following the product's transfer from FileMaker — formerly Claris — to Apple), Windows will continue to be supported in the forthcoming Version 5.0.3 and into the future.

### Linux

The Linux developer community seems to have overlooked one minor detail: most users require a decent WYSIWYG word processor. Fortunately for the Linux user community, commercial vendors have picked up where the open-source developers have left off.

Applixware, Red Hat's suite offering, ships with a complimentary copy of its popular 5.0 distribution. It includes a word processor, spreadsheet, graphics package, mail program and HTML authoring application. Though not as slick as some of its

Windows counterparts, the components sport many of the same features, including international spell check and the ability to embed objects (such as spreadsheets) in other documents. Applixware can also import numerous file types, including Word 6.0 and Excel 4.0 documents. See <http://www.redhat.com/> for more information.

Corel has also promised to release CorelOffice 8.0 on the Linux platform, presumably inspired by its line of Linux-based NetWinder NCs. Included in the suite will be the full range of office applications. The beta version of WordPerfect 8 we examined proved to be feature rich, stable, and a promising sign of things to come. See <http://www.corel.com/> for more information.

StarDivision is gearing up for a new release of its StarOffice suite, which has always been popular by virtue of being free for non-commercial use. Unfortunately, at the time of writing, there were still no details available about Version 5.0 (at least not in English). By the time you read this, however, the company's US site (<http://www.stardivision.com/>) should be updated to include more information.

Finally, it's worth mentioning that both KDE (K Desktop Environment) and the Gnome (GNU Network Object Model Environment) projects plan to include office applications. Although complete suites may still be some time away, it's definitely worth keeping an eye out for. **Stephen Withers and Travis Simon**

Also new and unique to the suite is an Install-on-Demand feature, which saves you in 'just-in-case' installs of Office components. Now rarely used components can be downloaded from the network or CD the first

time they're called upon, rather than wasting disk space on things users may or may not need. Be warned: this feature is S-L-O-W.

Then there's the 'learning menus' feature, in which infrequently used menu



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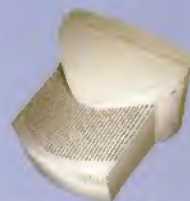
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items 'disappear' from the menus, and only reappear when the user holds the cursor over the menu for a moment or clicks a chevron at the bottom of the menu. Although we found this feature very annoying — particularly when you can't remember how to do something, and are searching menus for the right option — inexperienced users may find it helps make the suite easier to use. This feature, like so many features of Office 2000, is optional, and can be turned off if required (if you can find the right menu option to do so, that is).

The help system, the Office Assistant, has been retained and improved in this version of Office, with better support for natural language queries.

## A look at the applications

For most users, there's little other than personal preference and the power of familiarity to distinguish between Word and the word processors provided in the other two major suites. The base functionality is the same, and the deeper features are almost never used.

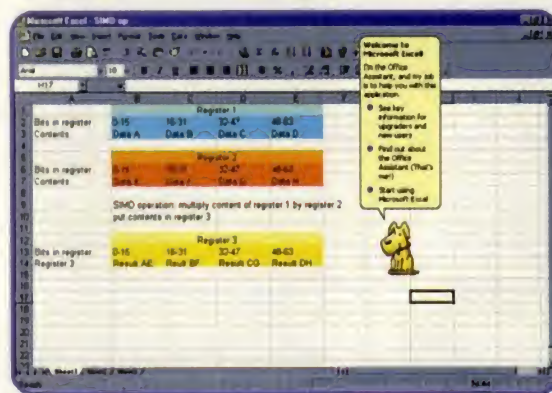
Word, of course, does have the advantages common to the rest of Office, including the integration between messaging, databases and the Web. The new collect-and-paste feature is a real boon for many writers, and the HTML publishing of Word documents makes it a good WYSIWIG environment for beginners to create Web pages for intranet consumption.

Excel is clearly the best of the spreadsheet applications found in the three suites. Its interface is the most intuitive, its feature set the largest, and the number of third-party add-ons is huge. This is not to say it's perfect. Its interface has become a little cluttered of late, although this can be fixed with Office's new customisation features.

It's often joked that Excel is the world's most popular database — so many organisations use Excel sheets to store all their accounting and sales information, rather than a proper database. The offshoot of this in Office 2000 is a number of new and improved data analysis tools. Excel 2000 features pivot tables and charts, deliverable over an intranet as ActiveX controls, for use as fast data analysis tools. Pivot tables can be generated direct within Excel, and then exported as ActiveX controls (and conversely, the controls can export their data to Excel). The data source for the pivot tables and charts can be Excel itself, or any other OLE DB data source (which includes Access).

Like Excel, PowerPoint 2000 is clearly the best product of its type going around. Designed primarily for presentations, PowerPoint can also be a useful idea organisation tool. Its features are top-class, and a new tri-pane interface design (obviously modelled on some programming tools' integrated development environments) makes concurrent development and viewing of presentations easier than previous versions of PowerPoint.

Apart from the new interface, the greatest changes to PowerPoint 2000 involve remote and Web-based presentation. In the case of the former, PowerPoint presentations can be 'broadcast' using Microsoft NetShow and NetMeeting. For the latter, PowerPoint 2000 includes some excellent HTML export features, which now generate frames for presentations. This, in addition to a whole host of new templates (most of which don't seem much more useful than those of previous versions) and a gamut of new features make PowerPoint one of the biggest upgrades in Office 2000.



Access is a fine tool for designing simple databases and reports targeted at small workgroups. Designing an Access database is not something you'd throw your grandmother at, but it certainly does not require a degree in database engineering. Nonetheless, we have seen better design environments — perhaps for its target market, Access is a little *too* detailed, requiring some design work that is beyond the scope of many common users. Fortunately, a number of helpful wizards and examples are there to provide assistance for beginners. The biggest change to Access 2000 lies not in the user interface, but in the back end, where there is support for the more robust SQL Server engine for data storage and retrieval.

Outlook 2000, if it is anything like Outlook 98, is an outstanding news and email

client, scheduling tool and collaboration tool. As a personal information manager, it still lags a little behind SmartSuite's Organizer, but in collaboration it is unrivalled among the other suites. Group calendaring is supported by Outlook, and a 'today' view details, in a readily accessible way, all the day's appointments, meetings and events. It can also draw information from the Web and other sources and display them readily on the user's desktop. Outlook's support for HTML mail means it can also be used to send other Office documents around as HTML rather than attachments.

Outlook 2000 has improved upon many Outlook 98 features, with support for things such as publishing your calendar as Web pages, and support for mail receipts, as well as automated booking of resources such as meeting rooms.

As is typical with most Microsoft products released of late, there is the obligatory installation of Internet Explorer, in this case IE5. Apart from furthering Microsoft's goal to have IE on every desktop, IE5 does have a few features which make it applicable to

inclusion in the integrated suite. It incorporates the new discussion features found in the rest of Office, operates as a universal viewing environment for documents created in Office 2000 (even if you don't have the individual application installed) and also operates as a server and disk navigation and previewing environment.

IE5 will use the XML tags in an Office document to detect the application in which the file was created, and it will launch the document in that application if it

is available. Otherwise it will open it as a normal Web page.

With all these features, Office still deserves its place at the top of the office suite heap. Office 2000, when it is released, may not contain enough to compel many users to fork out for an upgrade, although for groups desiring collaboration tools with their office suite, it should prove to be ideal.

**Nathan Taylor**

■ <b>Distributor</b>	Microsoft
■ <b>Phone</b>	132 058
■ <b>Online</b>	<a href="http://www.microsoft.com.au/">http://www.microsoft.com.au/</a>
■ <b>Price</b>	Not yet announced
■ <b>In short</b>	The strength of its applications and the level of their integration make Office 2000 a likely winner in the suite stakes.



Are you getting the most from your PC's sound system? APC reviews a dozen of the best blasting PCI soundcards around. **By Jeremy Torr**

## Astounding sounds

**G**enerally speaking, we put up with some very ordinary sound output from our PCs. Compared to even the most basic home hi-fi system, most soundcards and their associated speakers produce very poor sound quality. Squawky, tinny and low power, they often use tiny speaker drivers in a highly resonant plastic box.

However, there is a glimmer on the horizon. With almost all PCs now coming with PCI bus slots as standard, the soundcard can be freed from the constrictions of the ISA bus which held sound firmly in its 16-bit, 8MHz grip. This has obviously slowed things down considerably, and also demanded much of the CPU to produce decent sound quality. Now the 32-bit 33MHz PCI bus can let soundcards have their heads to a much greater degree, and can enable the use of embedded specialist processors onboard the cards themselves. This is a much more efficient system, and offers the added bonus of freeing up the CPU for other tasks — especially useful with today's processor-intensive games. They are also generally much easier to install, thanks to PCI Plug and Play links available under Windows 95 and 98, and much simplified IRQ and DMA setups.

The only problem with the move to a PCI soundcard is that some older DOS-based games can develop a few headaches and refuse to play ball, but virtually all the current generation of games use either DirectX DirectSound or Aureal A3D. Most current cards support these standards as well as standard Sound Blaster compatibility. The general level of quality of the PCI soundcards is higher than comparable ISA units, simply because the input quality can be to a higher level.

But the environment is very important too. The card should be as far from any sources of interference as possible (power supply, cooling fan and so on) and should be shielded from outside interference as much as possible. We found a distinct difference between tests conducted with computer cases on or left off — the cards are designed



to work with cases on. One other issue is that the brilliant 3D effects some of these cards offer drain existing processing resources, so don't expect to get silken smooth results on a Pentium 100MHz machine. Although virtually all the cards offer 48kHz sampling range, this didn't necessarily result in CD-quality output. This can depend on the quality of printed circuit board construction and component selection.

Additionally, as most soundcards are aimed at the game player whose speaker systems won't necessarily be state of the art, makers often allow the frequency response to drop off at top and bottom. Some include a peak in the centre of the curve to accentuate voice output, so feeding into a hi-fi system can require a little tone control tinkering for best results. Fitting most of these cards in a PC is a simple affair, but be aware that some will demand quite a degree of configuration for levels, output settings and emulation. Some can get a bit confused by the plethora of sound processing chips masquerading as other makers' badged offerings. But they are well worth looking at as an alternative to ISA cards.



### EDITOR'S CHOICE

- **Diamond Monster MX200**

### HIGHLY COMMENDED

- **Aztech PCI 388-A3D**

The Diamond Monster MX200 is the absolute business for games, despite some foibles with legacy games and installation procedures. It has tons of good software with it, and excellent connectivity, and should keep you in good noise for years to come. A loud, proud and very realistic sound source for the most punctilious of listeners.

Also impressive is the Aztech PCI 338-A3D. This product has almost everything the Monster has apart from four-speaker support, and costs under \$100.



## PCI 338-A3D

AZTECH

This card appears to have come off exactly the same production line as the Turtle Beach Montego. The two cards have the same PCB layout, same shape, same Aureal processor chip and same socket layout, and both are made in Indonesia. But the Aztech



definitely has the more attractive price tag — this card costs a mere \$99, but has fewer capacitors than the Turtle card.

Admittedly, the connectors are the smaller IDE type, there is nowhere near the bundled software quality (or any free games), and the instruction booklet is pretty basic, but that's still a big difference. Luckily for Turtle, there's a difference in sound quality too.

Once connected (no CD cable is supplied) to one of the three available internal connectors, the system is recognised and the supplied CD unwinds drivers smoothly onto your host PC. Three colour-coded output jacks plus a MIDI/joystick port provide standard external game and sound connections. A daughterboard wavetable socket is also available for extra voice capacity, although details of this are somewhat hazy. This can supplement the 32 hardware and 32 software voices present as standard.

Running an audio CD through the card couldn't match the extended detail of the Montego at either end of the frequency range, but offered truly excellent staging and voice nonetheless. DOS sound handling seemed slightly better than the Montego, but there was some fuzziness that seemed to cycle in and out. MIDI output was nowhere near as smooth and refined as the Turtle and sounded much more metallic and harsh. A3D output, however, managed almost the same quality of immersion and solid bass. Overall a solid value package for those who want to game but not create at a good price.

■ **Distributor** Westan  
 ■ **Phone** (03) 9563 6775  
 ■ **Online** <http://www.aztech.com.sg/>  
 ■ **Price** \$99

### ■ In short

Ideal card for the gamer who wants top value without paying top dollar.

## Sound Blaster PCI64

CREATIVE

The PCI64 we looked at for this review was an OEM unit, and came in a box with a driver and applications CD and nothing else. Presumably the retail version would include an instruction manual, and possibly even a CD audio cable.

The CD included the usual swag of applications including Creative's integrated Inspire suite, which links a whole range of mid-level audio tools together and also to Creative's Web site. The card itself is a rebadged Ensoniq, and comes with the ES1370 chipset which offers 64-channel wavetable polyphony. This is complemented by two colour-coded input jacks and one output jack on the rear panel, plus a standard MIDI and joystick connector.

Once loaded, the card showed its mettle by rattling the speakers with the Windows 98 theme. Outputs levels are obviously relatively high, and thus ideal for unpowered speakers. Through an amplifier, small children will wilt. The quality was also pretty good. MIDI playback showed good detail and precision, well ahead of the metallic twanging of some of the less capable cards.



Likewise, CD audio was good, with a better-than-normal bass extension and good imaging, although not quite up to the clarity of the Sonic Impact. The higher-than-usual output levels revealed some nice details that other cards lost in the background of Activision's BattleZone, but sadly Apogee Software's Mystic Towers under DOS was a complete washout with a terrible crackling coming and going at the most inopportune moments. Nonetheless, a good performer for the gamer, if a bit pricey given the overall bundle contents.

■ **Distributor** Creative Pacific  
 ■ **Phone** (02) 9906 8887

### ■ Online

<http://www.cppl.com.au/>

### ■ Price

\$159

### ■ In short

Solid, powerful, very compatible. Just a tad expensive given the competition.

## Sound Blaster PCI128

CREATIVE

This card is Creative's top rater, and comes with as many bells and whistles as the Mardi Gras.

The card uses mostly surface-mount ICs and a whacking great heatsink that cools the output amp chip, which should all make for long-term reliability. Input options are three Sony-style sockets for CD, telephone and tuner. There are line-out and unpowered speaker outputs, line-in and microphone jacks, plus a MIDI and joystick port. One unique aspect of the PCI128 is the



doubling up of the line-in jack as an output for a pair of rear speakers. This allows the card to be set up with four surround speakers all supplied by separate sound signals.

The card uses Creative's 5507 chip, which appears to be sourced from ESS, as Windows 98 recognised it as a PCI64 card. Installation was a bit confusing, partly because of Windows' confusion over the chip, but once installed the card behaved well enough in most areas, and came with a good range of audio software. Power output (thanks to that heatsink-equipped amp) was way above average, and CD audio was easily the best aurally of all the cards, with an extended response good enough for most hi-fi systems to use as a source. The 128-voice MIDI output was also very smooth and punchy with excellent bass response. Gameplayers might find the output a bit sibilant with the wick turned up — BattleZone sounded a bit scratchy in places. DOS in a box produced the same crackly buzzing as the PCI64, and unfortunately the PCI128 couldn't produce a peep running under the DOS prompt.

As an audio card, it's very good value. But as a game card, especially for surround games, it isn't quite up with the pack.





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- **Distributor** Creative Pacific
- **Phone** (02) 9906 8887
- **Online** <http://www.cppl.com.au/>
- **Price** \$249
- **In short** Top audio quality, but the 3D and game aspects not quite as good value as some others.

## Monster Sound MX200

**DIAMOND**

This is an expensive soundcard, but if you need the ultimate games device, this is the one. It offers much more effective four-channel sound than the Creative cards, throws in A3D, 64-voice capability, and enough bundled games to keep you mesmerised for weeks. Outlaws, Incoming, Star Wars Jedi Knight, plus a host of A3D demo and audio applications are all in the box. Definitely top of the list in terms of freebie goodies.

Luckily for potential buyers, Diamond doesn't only offer the bag of treats to justify the admittedly high price. It uses a couple of Analog Devices programmable DSP chips plus Diamond's own Freedom 5600 processor.



The quality of audio is very good, with MIDI that comes a close second to the Montego in smoothness and breadth. In terms of CD audio it wasn't quite so impressive as the PCI128, but was pretty good nonetheless. But when four separate speakers were plugged into those two audio outputs, BattleZone well and truly lit up. It was way ahead of the rest in terms of spatial effectiveness and realism, if not quite with the down-low punch of the Creative products.

However, installing the card isn't quite so simple. The booklet is unhelpfully brief for first-time users. Our install first threw up an error message telling us we needed new DSP drivers from the Web, then lost all sound under DOS, then eventually decided to work after we reloaded from scratch. Not the smoothest of installations, especially as no DOS hardware support is included. You'll need software

## How we tested

### Technical testing

The soundcards were tested using an Audio Precision Pro System 2, which is regarded as professional-level audio-testing equipment. The unit was used to test four main areas of soundcard performance: Frequency Response, Signal to Noise Ratio (SNR), Total Harmonic Distortion + Noise (THD+N) and Intermodulation Distortion. Each of these tests is explained below.

### Frequency Response

This is a measure of how well the soundcard can record and play back certain frequencies. The range of frequencies used is 20Hz to 20kHz, which is the generally accepted range of frequency audible to the human ear. The ideal case is for a straight line at 0dB, which means all frequencies have an exact response, although this almost never happens in real life. The straighter and flatter the line, the better, and a deviation of  $\pm 1$ dB is acceptable, as this is barely audible.

### Signal to Noise Ratio (SNR)

This is an indication of how noisy or quiet the soundcard is. Essentially, it's the difference between the loudest signal the card can play before distortion, and the noise the card produces on its own when it's not producing a signal. This is expressed in decibels, and the larger the figure the better. The optimal result is -96dB, but this rarely happens in real life. A signal-to-noise ratio of -75dB is reasonable.

### Total Harmonic Distortion + Noise (THD+N)

This measures the distortion and unwanted noise that the soundcard produces when it generates sounds. The lower the THD+N value the better; lower than 0.1% is acceptable.

emulation (with associated IRQ conflict potential) or to leave the existing soundcard in, which is rather cumbersome. But nonetheless, for games in the round, there's no competition.

- **Distributor** Chips and Bits
- **Phone** (03) 9696 1911
- **Online** <http://www.diamondmm.com.au/>
- **Price** \$349
- **In short** The ultimate in immersive gaming, but with a few installation quirks.

### Intermodulation Distortion

When a musical instrument produces a sound, as well as creating waveforms, the waveforms combine with each other to form harmonics. Soundcards can simulate these sounds but they also tend to generate some harmonics of their own, which don't sound very pleasant at all. Measuring Intermodular Distortion is the most common way of determining how much of this unwanted distortion is created by the audio device. Anything above 0.1% is approaching an unacceptable level of distortion.

### Further testing

After these tests, the cards were installed into a 233MHz Pentium with 48M of RAM and a Matsushita 12-speed EIDE CD-ROM drive running Windows 98. Output was taken using standard stereo jack or RCA line outputs and fed into a Sherwood 80W-per-channel stereo amplifier via the auxiliary channels. Output was sent to a pair of Aiwa E-1 bookshelf speakers rated at 30W RMS each. Basic install routines were adhered to using the manual instructions, or Windows was allowed to detect and set up if possible.

Once installed, the system was checked aurally using a range of audio CDs featuring both vocals and instrumentals.

Next, we ran a couple of standard MIDI files, plus an XG extension file to check the multi-voicing capability.

For gameplay output, we used a copy of Activision's BattleZone under Windows 98, plus a very old version of Apogee Software's Mystic Towers to test DOS compatibility both in a window and direct from the C: prompt.

Note was also taken of the quality and quantity of install and user instructions, accessories such as connectors, bundled software, applications and games. Lastly we factored in the price to give an overall value rating.

## Sonic Impact

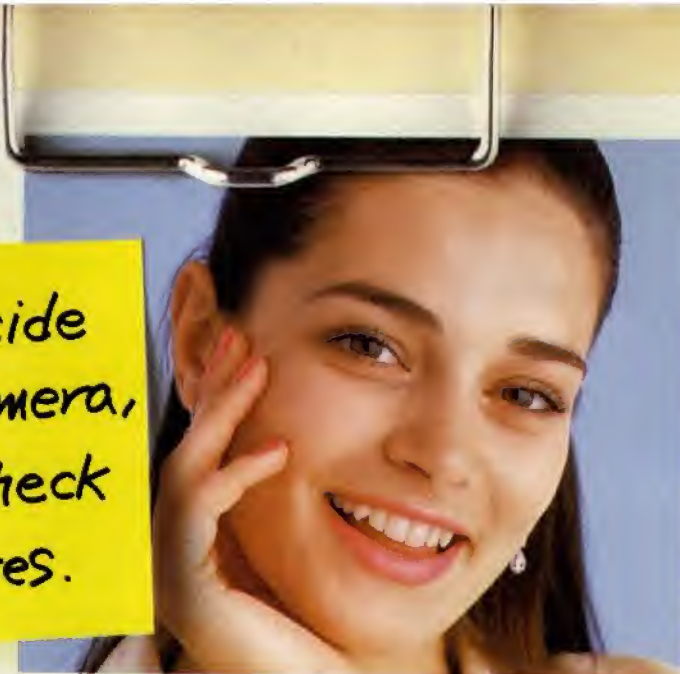
**DIAMOND**

The Sonic Impact is Diamond's entry-level option for those that can't go the full Monster. It uses an ESS Maestro 2 chip that's a bit less powerful, but still offers 64-voice hardware wavetable processing.

The card includes two output and two input jacks as well as the MIDI connector, four internal source connectors and a side-band jumper which gets little mention in the



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| <input checked="" type="checkbox"/> Does it have a viewfinder that makes your framing easier?<br>● ● ● ● ●                                     | <input checked="" type="checkbox"/> Is it CAMEDIA brand — known for high-quality products and high-quality pictures?<br>● ● ● ● ● ● ● ● ● ●            |



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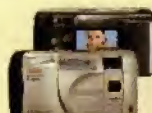
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- 5mm lens (36mm on 35mm camera)
- Slide-open lens barrier



instructions. In fact, the instructions are about the only weak point in the Sonic Impact's presentation. The card comes well packed with a driver and application including a whole range of useful mid-level audio apps, a full version of Maxis SimCopter and an Internet Sound Bar voice application. No connecting cables are provided.



Installing was straightforward from the supplied CD, which included Windows NT and 9x drivers, but no others. The box and data claims DOS functionality in hardware, but our test on Mystic Towers only worked if the game was run from the command line, not in a DOS box.

Both MIDI and CD audio were very precise and exhibited excellent timbre and detail — it was surprisingly good for a mid-level card and right up there with the Montego. Gameplay audio from BattleZone was also much more detailed than the price might suggest, with the imaging and separation as good as it gets without A3D. The card did seem to slow things slightly on BattleZone, so perhaps the ESS chip doesn't offload the main CPU quite as much as the Aureal chips. But as long as you don't demand DOS in a box, a very impressive all-round option.

■ Distributor	Chips and Bits
■ Phone	(03) 9696 1911
■ Online	<a href="http://www.diamondmm.com.au/">http://www.diamondmm.com.au/</a>
■ Price	\$149
■ In short	Well-rounded product with everything ready to roll out of the box.

## PCI Digital Aureal

PINE

This is a pretty cheap card at under \$65, but it still produces the goods up to a very creditable standard.

The card itself includes an Aureal-Vortex 8820B2 chip, an Analog Devices DSP chip with the rest of the component count all discrete components on the Chinese-made PCB. External jack sockets include separate line and speaker outs, as well as

microphone and line in. A MIDI connector is also available. A jumper can be enabled to allow either passive or active microphone input. This level of connectability is better than some cards costing three times the price.

Installation was reasonably simple, partly thanks to real booklets, not just CD-based PDF files, but did require a bit of navigating through a maze of language directories on the driver CD. When everything had been discovered and installed, the card swept into action in a surprisingly confident manner. Although the audio CD output was a bit thin compared to more expensive and powerful cards (there were noticeably less bass and a few extra sibilants), MIDI and A3D were both really quite good at producing thumping bass and very good attack and immersion.

Output power was also reasonable, with as much oomph as the much pricier Monster. The supplied software is comprehensive, consisting of some Aureal demos



and set-up utilities complemented by drivers for every OS you can think of, a workable MIDI sequencer, reasonable wave editor plus a Yamaha XG 128-voice extension program. Overall, a very well-balanced and extremely good-value package for any PCI machine.

■ Distributor	Multimedia Technology
■ Phone	(03) 9419 6600
■ Online	<a href="http://www.mmt.com.au/">http://www.mmt.com.au/</a>
■ Price	\$64.99
■ In short	Top all-round value for almost every kind of user.

## PCI Solo

PINE

Based on the same basic card as the Pine Aureal, this card certainly is adequate to produce sounds from your PC, but at \$47 you can't expect much more than that. And you don't get it.

Installation is from three floppy disks rather than from a CD, and the card does come with a basic instruction booklet. But



from there on it all gets a bit wrinkly. Loading the drivers under Windows 98 produced little more than a terminal crash requiring a complete reloading of the whole operating system. On repeating this, the same happened, so the only recourse was to load Windows 95, which did the trick and let the required drivers load.

The card is fairly sparsely equipped with an ESS 1938 chip and a few capacitors. There are three output jacks: for microphone, line in and line out.

Bundled software includes a basic sound application set and CD player rack and no more.

When set up, the Solo was not that bad, and certainly better than most ISA cards. When playing audio CDs, the sound quality was pretty much the same as the Pine Aureal card with a bit of top and bottom thinness. MIDI was noticeably down on the majority of the competition, sounding like a really old Hammond organ in the local RSL. BattleZone fared a bit better, but imaging was nowhere near as good as the Aureal-equipped cards. If you are looking for a bargain PCI card, this probably isn't it. Save up the extra \$18 and go for the A3D version instead.

■ Distributor	Multimedia Technology
■ Phone	(03) 9419 6600
■ Online	<a href="http://www.mmt.com.au/">http://www.mmt.com.au/</a>
■ Price	\$47
■ In short	Bit of a bargain-basement mixed bag. Workable, but a few holes in the package.

## 128 PCI

TERASOUND

This card is supplied as a 64-voice hardware unit, but comes with a Yamaha YXG50 software voice extension to give a total of 128 voices — not bad for a \$99 product.

The half-length card is fairly standard in appearance, with microphone and line-in plus line-out/speaker sockets on the back panel. The processing chip is an ESS 1968 with a nice big TeraSound sticker on the top to disguise it.



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The box contents include a driver CD, an XG serial number certificate and little else. Evidently, TeraSound isn't big on extras. Installation was a bit flaky. Windows 98 thought it recognised the ESS chip and tried to install it by default. A reboot and install by way of the driver CD was required to get everything installed. A reasonable set of utilities is included as well as the Yamaha XG player and a good selection of samples.



Output quality was good on audio CDs, producing intimate vocals and good definition, if a little light on bass. MIDI was excellent, and the XG samples showed how realistic a good MIDI track can be. There were no signs of raggedness or fluffing anywhere. BattleZone wasn't quite so sparkling; the card tended towards a slightly muffled and confused sound field. Mystic Towers was as good as any in a window, but locked up when run from the command prompt; neither are very helpful for keen gamers. But if you want to tinker with the MIDI concept and can't afford a Turtle Montego, this card is well worth a look.

■ <b>Distributor</b>	Intresource
■ <b>Phone</b>	(02) 99807 6999
■ <b>Online</b>	<a href="http://www.intresource.com.sg/">http://www.intresource.com.sg/</a>
■ <b>Price</b>	\$99
■ <b>In short</b>	Ideal for the would-be MIDI producer on a budget.

## A3D PCI

### TERASOUND

The TeraSound A3D card is much the same as the TeraSound 128, but comes with the Aureal chip instead of the ESS. The supplied CD loads the drivers and a few demo files for the 3D effects. The instruction manual is a very light affair. It does, however, give the main points needed to get the card in and working, plus jumper settings for the options of powered line-out or passive speaker output. The latter offers 6W, which is adequate if not astounding for unpowered speakers.

No connector cables for CD or other inputs are included, although the card boasts a total of five internal mini-pin connectors for an impressive range of

input options. The bundled software is fairly standard, and includes a 128-voice synthesiser, BattleZone and Explorer. The box claims compatibility with older DOS games using TDMA hardware emulation.

In practice, the TeraSound managed some understandable if slightly rattly and distorted output on Mystic Towers. The Aureal output was as expected — very impressive on BattleZone, with an excellent immersion factor. Overall, output on CDs was slightly down at the low end of the audio spectrum, but very clear and controlled on both voice and instruments. Given the price, and the input and output options, this is an attractive device that does everything more than adequately.

■ <b>Distributor</b>	Intresource
■ <b>Phone</b>	(02) 9807 6999
■ <b>Online</b>	<a href="http://www.intresource.com.sg/">http://www.intresource.com.sg/</a>
■ <b>Price</b>	\$99
■ <b>In short</b>	Excellent value. Copes with a good range of inputs and outputs, and even old DOS games.

## Montego A3DXstream

### TURTLE BEACH

Turtle Beach has established an enviable reputation for quality in the sound arena, and this card has all the right hallmarks. Big box, lots of accessory software, bundled connector cables and a clear and informative installation and usage manual. The card itself is a very unusual truncated shape which has the side effect of making connecting cables less exposed to



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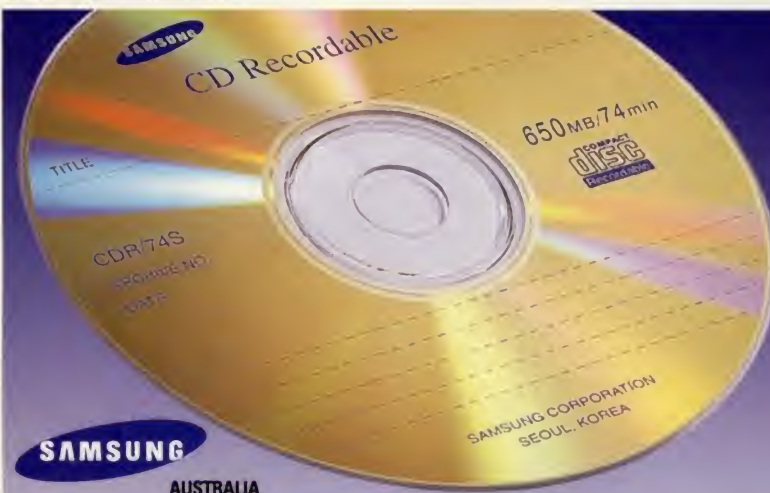
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case damage. It is a half-length card with no built-in amplifier stage, so you'll need amplified speakers. The standard line-in, line-out, microphone and MIDI/joystick ports are on the backplate, plus three internal connectors. Installing is simple, and usefully includes both Windows NT and 3.1 drivers.

The chip used is an Aureal Vortex, and the card supports MPU401 MIDI with 64-voice wavetable. Output was noticeably smoother than most on MIDI playback, and CD output was also better in terms of both imaging and clarity than many others.

The A3D was truly skull-wobbling in terms of depth and attack, but not quite so entrancing as the TeraSound A3D in terms of positioning. DOS sound playback was there, but was pretty woeful and almost painful at times. Judging by the outputs and joystick port, this card seems aimed at the standard gameplayer, not the audio dabbler, and as such it is reasonable value given the meagre games software included (BattleZone Lite) but not really any more. If you love quality, get it, but it is expensive for its capability.

- **Distributor** Teco Multimedia
- **Phone** (03) 9720 9833
- **Online** <http://www.tbeach.com/>
- **Price** \$329
- **In short** Very comprehensively equipped soundcard, but pricey given the target market.

## Storm VX

XITEL

The Storm VX is a bare-bones package from Xitel. It doesn't include any bundled software applications — only demo software — or connector cables, and comes with a pretty basic manual for installation and use.

It does, however, offer A3D via a Vortex A8820 chip, has a special headphone matched-out socket in addition to a line-out, and a pair of internal input connectors. It also has many more discrete (as opposed to surface-mounted) components and a jumper that gets no mention in the manual. Installing is straightforward, and there's a good range of drivers for NT, 95 and OSR2 all on one CD.

The sound quality on CD audio was reasonably good, but with some very slight intrusion noise evident. The overall audio response was not quite as extended or as smooth as the Montego or Tera-sound, although MIDI was notably better than average. The DOS hardware emulation as usual produced very scratchy output on Mystic Towers. Don't expect hi-fi from old games with this one. A3D was good, but again seemed to have a slightly more restricted response than some others.

Taking into consideration the reasonable but not startling quality, the lack of



bundled software applications and the price, this card is probably OK if you can't find an alternative. Solid and workable, but if you are looking for the best value, it might pay to check a few other deals too.

- **Distributor** Alepine
- **Phone** (02) 9418 3322
- **Online** <http://www.xitel.com/>
- **Price** \$150
- **In short** A competent but unexciting card that has no outstanding features.

## WaveForce 192XG

YAMAHA

Yamaha says this PCI card is designed for the power gamer, the audio enthusiast and the musician. It could be right on the last one, but the first two categories can probably get better results for less from other specialist cards.

Unlike most of the opposition, Yamaha uses its own DS1 chip which has a set of XG MIDI extensions as its main advantage. Installation is completely standard, but for

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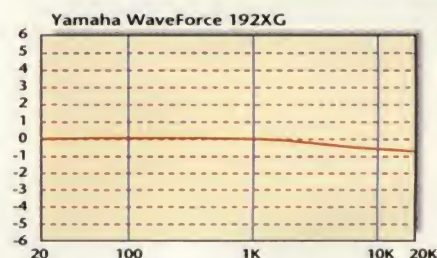
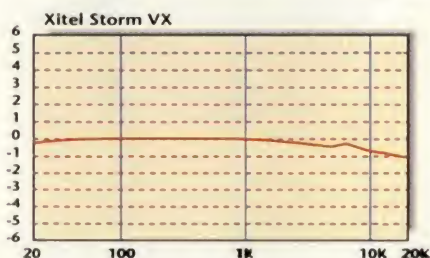
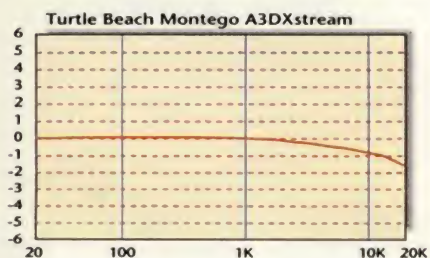
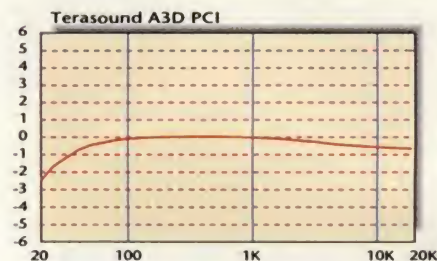
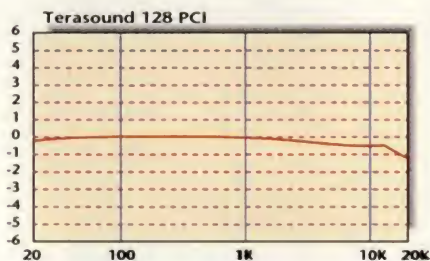
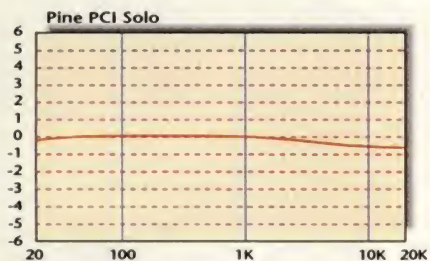
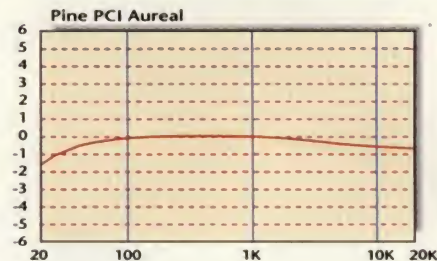
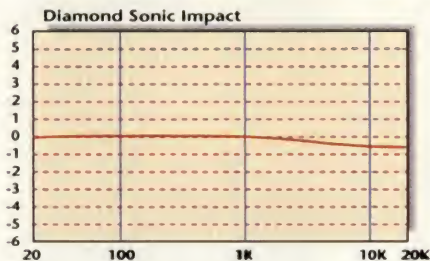
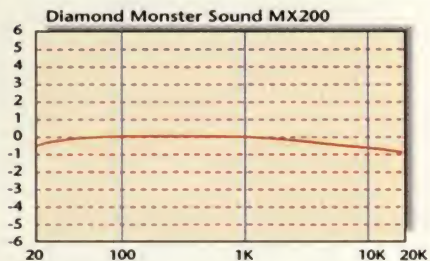
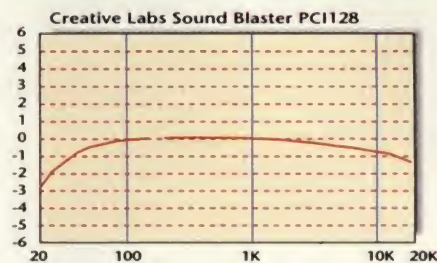
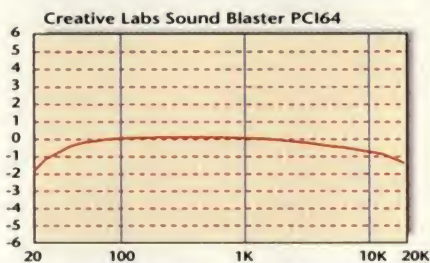
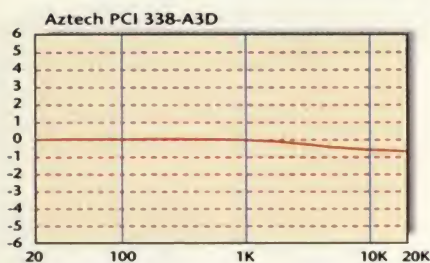


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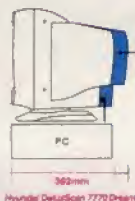
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Max. Resolution	1280 × 1024	1280 × 1024	1280 × 1024	1600 × 1200	1600 × 1200	1600 × 1200
On-Screen Menus	Yes	Yes	Yes	Yes	Yes	Yes
TCO option	TCO'95	TCO'95	TCO'95	TCO'95	TCO'95	TCO'95
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\* Windows 98 ICM profile : For display-to-printer WYSIWYG, Windows 98 requires ICM(Image Color Matching) profile for the display monitor. This profile is available free of charge at the place of purchase, or directly from Hyundai.



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full details, the user needs to install and run a PDF file, which could be an extra nuisance for the novice user. The card itself uses four back-panel sockets for line-in, line-out, microphone and speakers, plus a MIDI/joystick port. The supplied software includes a driver disk and bundled applications, plus a playable demo of AnimeNation's Final Fantasy. The software apps are all good-quality items, including a good range of very usable MIDI and WAV music editing titles.

Once connected, the Yamaha offers good if not amazing quality from most inputs, but seems to lack the presence of the Montego when it comes to voice from audio



CDs. The lack of full A3D is also noticeable when playing BattleZone, although Direct 3D does its best. As for DOS game reproduc-

tion, it was pretty awful; the sound was scratchy and distorted most of the time. Where the card shines is MIDI.

Yamaha's expertise has produced a card which is understandably very smooth. As a games card, it's not really being used to its potential. As a MIDI tool, it's among the frontrunners.

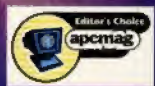
- **Distributor** Synnex
- **Phone** 1300 651 665
- **Online** <http://www.synnex.com.au/>
- **Price** \$189
- **In short** Quality MIDI but an otherwise average games card.

## Specifications: Sound cards

	Aztech PCI 338-A3D	Creative Labs Sound Blaster PCI64	Creative Labs Sound Blaster PCI128	Diamond Monster Sound MX200	Diamond Sonic Impact	Pine PCI Digital Aural 3D
Distributor	Westan	Creative Pacific	Creative Pacific	Chips and Bits	Chips and Bits	Multimedia Technology
Phone	(03) 9563 6775	(02) 9906 8887	(02) 9906 8887	(03) 9696 1911	(03) 9696 1911	(03) 9419 6600
Web site	<a href="http://www.aztech.com.sg">http://www.aztech.com.sg</a>	<a href="http://www.cppl.com.au">http://www.cppl.com.au</a>	<a href="http://www.cppl.com.au">http://www.cppl.com.au</a>	<a href="http://www.diamondm.com.au">http://www.diamondm.com.au</a>	<a href="http://www.diamondm.com.au">http://www.diamondm.com.au</a>	<a href="http://www.mmt.com.au">http://www.mmt.com.au</a>
Price	\$99	\$159	\$249	\$349	\$149	\$64.99
Sound chip(s) used	Aureal AU8220	ES 1370	Creative 5507	Diamond Facedom 5600	ESS Maestro-2	Vortex ALI8820B2
Hardware synthesis	Yes	Yes	Yes	Yes	Yes	Yes
Sample ROM size	4M	None	None	4M	None	1M
MIDI standards	General MIDI, MPU-401	General MIDI, MPU-401, MT-32	General MIDI, MPU-401, MT-32	General MIDI, MPU-401	General MIDI, MPU-401	General MIDI, MPU-401
Max hardware polyphony	32	64	128	64	64	64
External connectors	Mic-in, line-in, line-out, MIDI/joystick	Mic-in, line-out, aux-in/rear-speaker-out, MIDI/joystick	Mic-in, line-in, front-speaker-out, rear-speaker-out, MIDI/joystick	Mic-in, line-in, 2x line-out	Mic-in, line-in, 2x line-out	Mic-in, line-in, line-out, MIDI
Sampling range (kHz)	48	48	48	48	48	48
Four-speaker support	No	Yes	Yes	Yes	No	No
Sound Blaster emulation	Yes	Yes	Yes	Yes	Yes	Yes
ISA version available?	No	Yes	No	No	No	No
OSes supported	DOS, Windows 95, 98, NT 4.0	DOS, Windows 95, NT 4.0	DOS, Windows 95, 98, NT 4.0	Windows 95	DOS, Windows 3.x, 95, 98, NT	Windows 95, NT 4.0
APIs supported	A3D, DirectSound, DirectSound 3D	DirectSound, DirectSound 3D	DirectSound, DirectSound 3D, Environmental Audio Extension	A3D, DirectSound, DirectSound 3D	DirectSound, DirectSound 3D	A3D, DirectSound
Warranty	5 years	1 year	1 year	3 years	3 years	1 year

	Pine PCI Solo	Terasound 128 PCI	Terasound A3D PCI	Turtle Beach Montego A3Dxstream	Xitel Storm VX	Yamaha WaveForce 192XG
Distributor	Multimedia Technology	Intresource	Intresource	Teco Multimedia	Vendor Care	Yamaha Music
Phone	(03) 9419 6600	(02) 9807 6999	(02) 9807 6999	(03) 9720 9833	(02) 9948 5460	1800 805 413
Web site	<a href="http://www.mmt.com.au">http://www.mmt.com.au</a>	<a href="http://www.intresource.com.au">http://www.intresource.com.au</a>	<a href="http://www.intresource.com.au">http://www.intresource.com.au</a>	<a href="http://www.tecomultimedia.com.au">http://www.tecomultimedia.com.au</a>	<a href="http://www.xitel.com">http://www.xitel.com</a>	<a href="http://www.waveforce.com">http://www.waveforce.com</a>
Price	\$47	\$99	\$99	\$329	\$150	\$189
Sound chip(s) used	ESS Solo-1 ES1938S	ESS 1948	Aureal A3D	A3D Vortex	Aureal AU8820	Yamaha DS-1
Hardware synthesis	No	Yes	Yes	Yes	Yes	Yes
Sample ROM size	N/A	2M	4M	4M	None	2M
MIDI standards	General MIDI, MPU-401	General MIDI, MPU-401, Yamaha XG	General MIDI, MPU-401, Yamaha XG	MPU-401	General MIDI, MPU-401	General MIDI, XG, TG300B
Max hardware polyphony	None	64	64	64	64	64
External connectors	Mic-in, line-in, speaker out, MIDI/joystick	Mic-in, line-in, line-out, MIDI/joystick	Mic-in, line-in, line-out, MIDI/joystick	Mic-in, line-in, line-out, MIDI/joystick	Mic-in, line-in, MIDI/joystick, speaker-out, headphone-out	Mic-in, line-in, line-out, speaker-out, MIDI/joystick
Sampling range (kHz)	48	48	48	48	48	48
Four-speaker support	No	No	No	No	No	No
Sound Blaster emulation	Yes	Yes	Yes	Yes	Yes	Yes
ISA version available?	No	No	No	No	No	No
OSes supported	Windows 95, 98, NT 4.0	DOS, Windows 95, NT 4.0	DOS, Windows 95, 98, NT 4.0	Windows 3.x, 95, NT 4.0	DOS, Windows 95, 98, NT 4.0	Windows 95, NT 4.0
APIs supported	None	DirectSound	A3D, DirectSound, DirectSound 3D, ActiveX	A3D	A3D, DirectSound, DirectSound 3D	DirectSound, DirectSound 3D
Warranty	1 Year	2 years	2 years	1 year	3 years	1 year





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August '98



July '98



June '98



May '98



April '98



February '98

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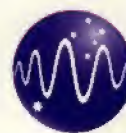
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Update your system with one of the latest AGP graphics cards and experience performance of new dimensions. **By APC staff**

# Pick a card

**S**ince we last reviewed graphics cards in March 1998, the consumer graphics card industry has developed very quickly. New chip technologies are developing so rapidly that out of the 13 cards in this review, only two use chips that were top of the line seven months ago. The rest of the chips from our March review have been superseded. In fact, even as we were reviewing the cards, new chips were being released. Two of these new technologies are previewed on page 137.

We reviewed AGP graphics cards based on the Intel i740, Matrox MGA-G200, nVidia Riva 128ZX and ATI Rage Pro chips. We requested cards with a minimum 4M of RAM, but this was the only limitation placed on vendors submitting cards for review.

## Speedy 2D/3D

As recently as the beginning of this year, it seemed that combined superior 2D and 3D performance in the same card was a long way away. This perception changed following the introduction of the Riva 128 graphics controller from nVidia. The Riva 128 chip has now been superseded by the Riva 128ZX, and there are many chips which compete at the same level of performance, if not higher. The new generation of chips that is just around the corner represents yet another leap in technology. Some of the current 2D/3D chips can be favourably compared with powerful, dedicated 3D chips such as the Voodoo2.

## How to pick a graphics card

A newer, faster processor chip and more RAM will almost always ensure better performance, but these improvements come at a price. Since many of the cards are equipped with the same graphics chip and basic configuration, choosing the best card is often a task of balancing the price with the bundled software to get the best deal for your needs.

At APC, we're very good at telling you about the technical side of graphics card performance. We can tell you how many frames per second (fps) the graphics card

can produce and how fast the RAMDAC (random access memory digital-to-analog converter) can convert the millions of numbers into electrical signals for the monitor. However, after a certain point this becomes a purely technical consideration.

The human eye, through an effect called persistence of vision, views a series of still pictures, such as you would see on a monitor or movie screen, and perceives them as movement. Movies at the cinema are shown at 24fps, while TV in Australia is shown at 25fps and these rates are adequate for giving the illusion of movement. While increasing the frame rate adds a certain degree of realism, there is a point beyond which our brains can not tell the difference. Graphics cards are becoming capable of faster frame rates (the Diamond Viper V550 achieved 112fps in one of our tests), but these improvements will make less and less difference to the perceived image quality.

Image quality also depends on criteria that can only be judged aesthetically: the way a card handles colour, the sharpness of the image, and the way it converts complex 3D shapes into two-dimensional images on the screen. We can tell you how well a card performs, but the way the graphics it produces look and feel is also important and this is a very subjective matter.



## What's coming up

As 3D graphics continue to drive the video card market, a wide range of faster chips have been announced. 3Dfx has adapted its Voodoo2 technology for the Voodoo Banshee, a 2D/3D chip said to offer stellar performance without the drawbacks of the Voodoo Rush. On the horizon, the Voodoo3 is slated to be a full 2D/3D card.

Stellar Semiconductor claims its VelaTX engine, due at the end of this year, produces 200 million pixels per second. It is based on the company's proprietary PixelSquirt architecture, and requires only a small amount of onboard RAM. Finnish company Bitboys Oy plans to release its 2D/3D Glaze3D chip in 1999, supporting up to 800 million pixels per second. Currently delayed, NEC and Video Logic's jointly owned PowerVR Second Generation will eventually appear in large quantities at a relatively low price, and should make an appearance in Sega's upcoming Dreamcast games console.

Silicon Reality's TAZ-3D promises to be dirt cheap and have excellent capabilities. The same goes for Number Nine's Ticket to Ride IV and ARK Logic's Tiger 3D. Wandering even further from its OpenGL base, 3Dlabs says its Permedia 3 will have a high fill rate and excellent colour depth, making it ideally suited to games.



**Asus AGP-V2740**

ASUS

Taiwanese manufacturer Asus seems to be playing the field with graphics chip manufacturers; the other Asus card in this roundup (the AGP-V3000ZXTV) is based on nVidia's Riva 128ZX, while the AGP-V2740 uses Intel's i740 graphics chip.

At \$199, the AGP-V2740 is at the lower end of the price scale for an i740-based graphics card. It has 8M of SDRAM, a 205MHz RAMDAC, and compared with similarly configured cards, performed well for the price.



Its test results were nothing special, with slightly below-average results in the Business and High-End Graphics WinMark 98 tests, as well as the 3D WinBench 98 test and two of the Quake II tests. However, the differences in test results between the cards equipped with Intel i740 chips were very slight. This was one of the least expensive cards we reviewed, and the cheapest card to have 8M of RAM. Budget-conscious buyers may be willing to sacrifice brilliant performance for the right price.

Josh Mehlman

■ **Distributor** Cassa Australia  
 ■ **Phone** (07) 5445 2992  
 ■ **Price** \$199

■ **Online**  
 ■ **In short**

<http://www.asus.com.tw/>  
 Relatively inexpensive for reasonably good performance.

**Asus AGP-V3000ZXTV**

ASUS

Only two of the graphics cards APC tested are capable of video capture as standard: the rather expensive ATI All-in-Wonder Pro and the Asus AGP-V3000ZXTV. This is particularly strange considering the prevalence of videoconferencing, not to mention the large number of people who use video-capable chat programs like NetMeeting and Internet Phone at home.

The AGP-V3000ZXTV is based on nVidia's Riva 128ZX chip, and comes with 8M of SGRAM. It has a 250MHz RAMDAC that contributes to the smooth, high-quality picture it produces.

Our tests found this card to be a very strong performer. Although it was let



down by its 2D graphics, it has an aptitude for high-end 2D graphics applications, as shown in its strong result in the High-End Graphics WinMark 98 test. Its 3D graphics performance was the best of all the cards we tested, with top scores in the 3D WinMark 98 test and two of the Quake II tests.

For \$299 you get the card, a full version of Incoming, video capture software and a one-year warranty. A version with-



## EDITOR'S CHOICE

● **Matrox Mystique G200**

## HIGHLY COMMENDED

● **Matrox Millennium G200**

## BEST VALUE

● **Amazing-1 AGP 3D**

Matrox's MGA-G200 chip combines excellent 2D graphics performance with very good 3D acceleration. The addition of OpenGL drivers will make it a powerful competitor in the 2D/3D graphics market. Although expensive, we felt its performance and features justified the cost.

For most of our tests, the Mystique was just slightly ahead of the Millennium, but they were both very strong performers. The Mystique is a very strongly focused games card, while the Millennium is aimed at a more general market. Both have excellent bundled software.

As for value, the dirt-cheap Amazing-1 AGP 3D can hold its own with the more expensive i740-based cards. This \$110 card ships with 4M of RAM, while most of the cards come with 8M or more. This may have contributed to its unspectacular 2D performance, but it seems to have made little difference to its 3D performance, which was among the best.

out video capture capabilities is available for \$249.

Josh Mehlman

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Microsoft Windows 98 and IE 4.0

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## Beyond SuperO Velocity

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USA SuperMicro SBA BX Mainboard  
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Matrox Productiva G100 8MB AGP Video  
LG 15" Multimedia Digital Monitor  
Quantum 5.1GB Ultra DMA HDD  
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Creative Sound Blaster AWE 64 Audio  
Option:Voodoo II 8M 3Dfx Accelerator  
Sony 3.5" Floppy & 32X CD ROM IDE  
Microsoft Windows 98 and IE 4.0

## Beyond SuperO Speedo

Intel 333MHz Pentium II Processor  
Option: 350/400/450MHz CPU  
USA SuperMicro SLA LX Mainboard  
Matrox Productiva G100 4MB AGP Video  
Sony 15" Trinitron Digital Monitor 0.25  
Quantum 5.1GB Ultra DMA HDD  
32Mb SDRAM  
Beyond Ergonomic 104 Keyboard PS/2  
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Logitech PS/2 Mouse  
Sony 3.5" Floppy & 32X CD ROM IDE  
Microsoft Windows 98 and IE 4.0

**\$2380**

## Beyond SuperO XeonServer

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Beyond SuperO Tower Server ATX Case  
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- **In short** The performance is great, and video capture is a bonus.

## All-in-Wonder Pro

ATI

ATI has packed the features into this bulky video card, but wow, do you pay for it! At \$949 this is by far the most expensive product in the group. Apart from 2D and 3D video from its ATI Rage Pro Turbo chip, the 4M All-in-Wonder Pro has TV-out, video capture and an inbuilt television tuner. It is bundled with two games and a video editing program.

The All-in-Wonder gave our test system a respectable Winstone 98 result of 22.9, but its score of 150 in the Business Graphics WinMark was a little below average. In the WinBench 98 High-End Graphics test, it scored 178.7, beating most of the cards we tested, but it was outclassed by products with Riva 128ZX and MGA-G200 chipsets.



Unfortunately, the All-in-Wonder wasn't a great 3D performer. It lagged behind the other cards, scoring 686 in the 3D WinMarks 98, and could only offer 23.6fps and 23.4fps in our Quake II demo gaming tests. With rivals scoring in the high 30fps, this card won't really satisfy gamers.

It is aimed at buyers looking for an all-in-one solution, but it is still not a replacement for dedicated 3D accelerators, such as the Voodoo2. This is probably the first time a card has offered so many features straight out of the box. It is by no means the best in any area, but if your demands aren't too high you'll never need another video card. The primary consideration will be whether you are willing to part with so much cash to achieve this.

Simon Vandore

- **Distributor** BBF Components and Peripherals
- **Phone** (03) 9761 4299
- **Online** <http://www.alitech.com/>
- **Price** \$949
- **In short** Features galore at a very high price.

## How we tested

We used two distinct categories of tests. We tested the 2D acceleration used in everyday Windows applications, and the 3D acceleration used in DirectX games and OpenGL applications. We used Windows 95 for all the tests.

### 2D tests

#### Winstone 98: Business Winstone

Winstone 98 is the new version of the Winstone benchmark from Ziff-Davis. Winstone runs a script of popular Windows 32-bit applications and times how long the PC takes to execute the script. We used Winstone 98 to test how the graphic cards affected the overall performance of the system. The higher the score, the better.

Our Winstone 98 tests ran at a resolution of 1,024 by 768 at a colour depth of 65,000 and a refresh rate of 60Hz.

#### WinBench 98: Business and High-End Graphics WinMark

The Ziff-Davis WinBench 98 Business and High-End Graphics WinMark test profiles the graphic calls that are produced in the Business and High-End Winstone application tests. The Business Graphics WinMark tests measure how the cards perform when executing common business applications. Again, the higher the score, the better.

### 3D tests

#### 3D WinBench 98: 3D WinMark

The Ziff-Davis 3D WinBench 98 3D WinMark tests measure the performance of all of the components within a PC's 3D graphics subsystem. Using DirectX3D's retained mode, it uses the Windows drivers to put the 3D graphics hardware to the test. A card with good Direct3D support should do well here.

Our Direct3D tests ran at a resolution of 640 by 480, a colour depth of 65,000 and a 60Hz refresh rate.

## Quake II Windows 95 test

Quake II from id Software (<http://www.idsoftware.com>) is a 3D shoot-'em-up that can use a subset of the OpenGL API to perform the intensive rendering needed for the game. Many of the new cards being released onto the market are being provided with OpenGL clients for Windows 95. We were interested in how many frames per second (fps) these cards could manage at a resolution of 640 by 480. We performed the test by making sure the correct OpenGL drivers were installed.

The test results show the average number of frames per second achieved when running through both the Demo1 and Demo2 play scripts, as well as how many frames per second were shown when the character is commanded to rotate 360° (as shown by the Timerefresh result).

## Testing environment information

All of the cards APC reviewed in this feature were tested on a single system. The system's specifications were:

- Dell Dimension XPS D333, a single Intel Pentium II 333MHz processor, 64M SDRAM, 512K secondary cache, Maxtor 8.4G UltraDMA hard disk, FAT file system and no hardware disk cache;
- Windows 95 OSR2 using system cache with access to all available memory.

To obtain our 3D WinBench 98 scores in the 3D WinMark tests we set the following settings for all cards: Direct 3D HAL, MMX emulation, 640 by 480 pixels, 16-bit colour, full screen, execute buffers.

All products used in this test were shipping versions available to the general public.

These tests were performed without independent verification by Ziff-Davis, and Ziff-Davis makes no representations or warranties as to the results.

Lachlan Botticchio

## Xpert 98

ATI

If there's one thing Canadian graphics card manufacturer ATI is sure of, it's that this card will last forever. It comes with a five-year warranty, which indicates it will most likely be obsolete well before it stops working. And as one of the market leaders with a large chunk of the market share of PC graphics peripherals, ATI isn't about to go anywhere.

Based on ATI's Rage Pro chip, which was first developed in 1996, this 1x AGP card ships with 4M of RAM, although it can be expanded to 8M. The Xpert 98 is also available in a PCI version.

This card did not score well in our benchmarking tests compared with the other cards. It was below average in all the 2D tests, and last in all the 3D tests. Expanding the RAM to 8M would most likely improve its performance.





This \$249 card comes with the game Shipwrecked, as well as image editor Ufi Photosuite.

Josh Mehlman

- **Distributor** BBF Components and Peripherals
- **Phone** (03) 9761 4299
- **Price** \$249
- **Online** <http://www.atitec.com/>
- **In short** ATI's Rage Pro chip doesn't cut it compared with the newer graphics chips.

### Stealth II G460

DIAMOND MULTIMEDIA

Diamond Multimedia has a reputation for making some of the best 3D graphics boards on the market — but it also produces some average cards. A prime example of this is the Stealth II G460. It has more features and better performance than its predecessors, but produced fair to middling results in our tests. The only test it excelled in was the Ziff-Davis Business Winstone 98, where it beat all the other cards.

When compared to similarly configured cards in this review (i740 chip and



8M of SDRAM or SGRAM — as in the Asus AGP-V2740, Hercules Terminator 2x/i and WinFast 3D S900) we found that the Stealth II G460 led the pack in the Ziff-Davis WinBench tests, but fell to the bottom of the four in the Quake II tests.

An advantage of owning one of Diamond's cards is that they are fairly stable, so you are unlikely to encounter any problems in setting up or using the Stealth II G460. Diamond also offers support and regular updates and driver releases on its Web site.

Darren Ellis

- **Distributor** Chips and Bits
- **Phone** (03) 9696 1911
- **Online** <http://www.diamondmm.com/>
- **Price** \$297
- **In short** Reliable card from a respected manufacturer.

### Terminator 2x/i

HERCULES

The Terminator 2x/i is one of the five cards in this roundup that are based on the i740 graphics chip. At \$256, it is in the middle

of the scale in terms of price. It ships with 8M of SDRAM and has a 230MHz RAM-DAC, which produced faster data throughput than the other Intel-based cards, but not as fast as some of the other cards in this review.

This 2x AGP card's ability to move data was clearly demonstrated in the test results. The Terminator 2x/i consistently performed well compared to the other i740-based cards, but the graphics



accelerators based on Riva 128ZX and MGA-G200 chips nearly always scored better.

The card doesn't ship with much bundled software, just the Hercules Touch and Hercules Entertainment Center desktop management utilities, which were very easy to use. The card comes with a five-year warranty.

Josh Mehlman

- **Distributor** Peripheral Sources
- **Phone** (03) 9878 8611
- **Price** \$256
- **Online** <http://www.hercules.com/>
- **In short** Nothing special, but comes at a good price.

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- Slot 1 & AGP slot support
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- AC Recovery ON/OFF Control Build in BIOS
- Support 3 Fan Detection Connectors
- System Health Check & Report by BIOS during boot
- Intel LDCM\* Utility

#### GA-6EMMP



- Slot 1 support
- Supports 66/75\*/83\* System Speed
- 2 DIMMs up to 256MB DRAM
- Power on by Keyboard, PS/2 Mouse, LAN, Modem & others
- ATI RAGE Pro on board (2 or 4MB SGRAM)
- YAMAHA PCI Sound 740 on board
- Micro ATX Form Factor (24.5 X 20 cm)

#### GA-5AX



- ALi Aladdin V (M1541 & 1543) AGPset
- Intel, AMD, IBM, Cyrix Processor 90~550 MHz Ready
- Socket 7 & AGP slot support
- 3 DIMMs up to 768MB DRAM
- 66/75/83/95\*\*/100 MHz main clock
- Auto slow down when CPU overheat (OS independent & Driverless)

#### GA-612



- Optimized drivers for OpenGL 1.1, DirectX 5.0 GDI and much more
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- Full Sideband AGP Initiator Support
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SA	Hallmark	(08)83403740			
	Kern	(08)83623784	NT	Hallmark	(08)89484451
	AKA	(08)83713388			



**WinFast 3D S900****LEADTEK**

Priced at \$310, the Leadtek WinFast 3D S900 is not cheap, especially when compared with similarly configured cards.

Equipped with an i740 graphics processor and 8M of SGRAM, this card has no great distinctions in terms of hardware, except that it has composite and S-Video outputs which allow you to plug it into a TV or VCR.

This card produced average scores in our benchmarking tests, although it was at the top end of the cards with the same graphics chip. Its performance in the Quake II tests was above average, indicating strong 3D graphics capabilities.



If you take into account the packaged software, the WinFast 3D S900 suddenly becomes more appealing. It comes with a plethora of 3D and video software, including VDOnet's VDOLive player and Asymetrix's Web 3D and 3D F/X.

Although it was outperformed by some of the other cards — which are also cheaper in some cases — this card cer-

tainly wins points for its collection of useful software.

**Josh Mehlman**

■ <b>Distributor</b>	Tech-Excel Distribution
■ <b>Phone</b>	(02) 9417 7898
■ <b>Price</b>	\$310
■ <b>Online</b>	<a href="http://www.leadtek.com/">http://www.leadtek.com/</a>
■ <b>In short</b>	Not cheap, but lots of packaged software enhances its value.

**Millennium G200****MATROX**

This highly anticipated MGA-G200 chip in its Millennium incarnation is aimed at graphics professionals and those who require the highest resolutions and refresh rates — it has a faster RAMDAC (250MHz) than the Mystique G200, but no TV-out capability. Various graphics software packages, rather than games, are bundled with the card.

In our tests of the 8M version, the Millennium G200's main rival was its Mystique counterpart. The Millennium scored a Ziff-Davis Winstone 98 result of 22.83, but its score of 162.33 in the Business Graphics WinMark test was a clear winner, and its 211 High-End Graphics WinMark result placed it way ahead of all the cards, bar the Mystique. Using the Millennium for Windows productivity work was a pleasantly crisp experience. This card emanates serious power.

On the 3D side, it scored 805 in the Ziff-Davis 3D WinMark test, a surprising 81 behind the Mystique, but still a reasonably good result. It was mainly outclassed by the Riva 128ZX-based cards, but on the other hand, the G200's ver-



sion of 3D is much more effective than on a Riva 128ZX.

At the time of writing, Matrox had not released a final set of OpenGL drivers for the card, so we did not include Quake II results here. However, a Direct3D wrapper was available which showed the card could handle Quake II's demands admirably, though it played jerkily for a few minutes after startup.

Also, several sources have reported incompatibilities between cards with G200 chips and Voodoo2-based cards. APC Labs tested the Millennium with a Diamond Monster 3D II card under various conditions using Quake II and Unreal, and could not replicate the problem, but an occasional juddering effect was experienced at high resolutions which could not be definitively blamed on either card.

**Simon Vandore**

■ <b>Distributor</b>	Focal Point Computing
■ <b>Phone</b>	(03) 9525 1144
■ <b>Online</b>	<a href="http://www.matrox.com/mgaweb/">http://www.matrox.com/mgaweb/</a>
■ <b>Price</b>	\$335
■ <b>In short</b>	A highly desirable 2D/3D card for professionals.

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## Mystique G200

MATROX

If you find the thought of playing your favourite games on a big-screen TV appealing, this is the card you should buy.

Based on Matrox's own MGA-G200 chip, this card handles the graphics demands of the toughest games. It ships with 8M of RAM, which can be expanded to 16M via an add-on card.

The Mystique is aimed directly at the serious gamer. Composite and S-Video outputs are included for plugging the computer into your TV or VCR. The packaged software comprises full versions of



Motorhead and Incoming, as well as demos of Forsaken, Tomb Raider II, Jedi Knight and more.

The card rated second, just slightly behind the Matrox Millennium in the Ziff-Davis Business and High-End Graphics WinMark 98 tests, and also second in the 3D WinBench 98 test. As the MGA-G200 is a relatively new chip, OpenGL drivers were not available at the time of testing, and we could not compare the Mystique

with the other cards in the Quake II tests. The distributor assured APC the OpenGL drivers would be available by the time this review was published.

Josh Mehlman

■ Distributor	Focal Point Computing
■ Phone	(03) 9525 1144
■ Price	\$335
■ Online	<a href="http://www.matrox.com/mgaweb/">http://www.matrox.com/mgaweb/</a>
■ In short	Games, games, games. If money is no object, this is the card to buy.

## Amazing-1 AGP 3D

QDI GROUP

The little Amazing-1 is simply a generic i740 board. It arrived in APC Labs without drivers, so we loaded standard i740 drivers, which worked fine.

At just \$110, this was the cheapest card we tested, and its bang for buck was spectacular. Although it bottomed out in high-end operations, the Amazing-1 did reasonably well across the board, beating much pricier cards in some of our tests.

It scored 23.1 in Ziff-Davis Winstone 98, and a score of 151.3 placed it firmly in the middle of the Business Graphics results. The 4M Amazing-1 was let down by a lacklustre score of 175.7 in the High-End Graphics WinMark, and it was beaten by most of the other i740-based cards we tested in 3D WinBench, scoring a lower than average result of 756.

Even though i740-based cards aren't strong performers in top-flight 3D gaming, they're not bad overall and (most importantly) the i740 now has quite wide



support among recently released games. Rage's Incoming played wonderfully using the Amazing-1, although the graphics were not quite as pretty as with the Matrox cards. If you're after better 3D performance, it could be a cost-effective solution to use the Amazing-1 for quality 2D and add a dedicated 3D card in a PCI slot.

No software is included (apart from some Intel 3D demos), but it comes with a two-year warranty, so at this price you can't go far wrong.

Simon Vandore

■ Distributor	Spear Technology
■ Phone	(02) 9904 8199
■ Online	<a href="http://www.qdigrp.com/">http://www.qdigrp.com/</a>
■ Price	\$110
■ In short	A great value, no-frills card with reasonably good performance.

## Velocity 128

STB SYSTEMS

STB Systems is another force in the 3D accelerator market, producing the Velocity, Blackmagic and Nitro cards. Its prod-

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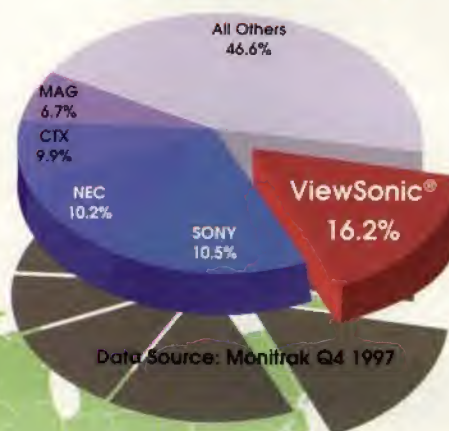


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Dot Pitch	0.27mm	0.27mm	0.27mm	0.27mm	0.27mm
Max. Resolution	1280x1024	1280x1024	1280x1024	1280x1024	1600x1200
Recommended Resolution	1024x768 @ 87Hz	1024x768 @ 87Hz	1024x768 @ 87Hz	1024x768 @ 87Hz	1600x1200 @ 76Hz
Horizontal Frequency(kHz)	30~70	30~70	30~70	30~70	30~95
Integrated Speakers				Yes	



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Tel: (08) 9228-0088  
Microbits Tel: (08) 8362-9220  
Comdek Tel: (08) 9324-3344  
Daltron Electronics (Papua New Guinea) Tel: 675-3256766



ucts are aimed at game players and 3D enthusiasts. The Velocity 128 8M card APC tested was an OEM release — so it came with no bundled games, just drivers and utilities. The retail pack, however, includes FIFA World Cup 98, Battlezone and Interstate '76, and retails for \$339.

The Velocity 128 is not the best 3D accelerator card on the market, but it does have some decent pixel crunching capabilities. Its strength lies more in its 3D than 2D proficiencies. It came equal second in the Ziff-Davis Business Winstone 98 test, but hovered in the



middle of the bunch for the rest of the tests. The Velocity 128 can also process

MPEG movies with little picture distortion.

The OEM release is reasonably priced, but the more expensive retail package includes extra games and utilities. At the end of the day, however, it's still an average card.

**Darren Ellis**

- **Distributor** Alfa Computers
- **Phone** (02) 9317 3344
- **Online** <http://www.stb.com/>
- **Price** \$339; OEM \$269
- **In short** Standard 3D card but still quite capable.

## New chip technologies

During the AGP graphics card testing period, APC received beta versions of three cards which use different new chip technologies. Unfortunately the first card — based on 3Dfx's Voodoo Banshee chip — melted during installation. Two other cards survived the installation and testing: the Hercules Terminator Beast, based on S3's Savage3D chip, and Diamond Multimedia's Viper V550, which uses an nVidia Riva TNT graphics processor.

As they were betas, and we tested them under slightly different circumstances to the other cards, they are not included in the main line-up. However, these reviews should give you a good idea of what's in store for graphics cards in the near future.

### Viper V550

**DIAMOND**

Incorporating nVidia's new 128-bit Riva TNT graphics processor chip, the Diamond Viper V550 card represents a serious advance in current 2D/3D graphics processing power.

The Riva TNT (twin-texel) graphics engine processes two pixels every clock cycle, which enables it (theoretically) to deliver up to 250 million pixels per second. A 250MHz RAMDAC and 16M of SDRAM ensures the highest possible resolution and the fastest refresh rates.

The Viper V550 is comparable to the Millennium G200 in 2D performance, but results for the Ziff-Davis 3D tests were another story. Of the other cards tested, the highest-scoring card in the 3D WinBench 98 test was the Asus AGP-V3000ZXTV, which scored 931. The Viper V550 scored 1,260.

The Viper V550 also achieved very fast



frame rates, managing 56fps in the Demo1 test. This is still not up to the standard of dedicated 3D accelerators such as the Diamond Monster 3D II's Voodoo2 chip, which achieved 68fps for Demo1, but is very impressive for a 2D/3D card.

At \$449, this card will out-price all but the most enthusiastic of games fanatics, but it is an impressive display of the latest graphics technology.

- **Distributor** Chips and Bits
- **Phone** (03) 9696 1911
- **Price** \$449
- **Online** <http://www.diamondmm.com.au/>
- **In short** Its 3D performance is brilliant, but comes at a price.

### Terminator Beast

**HERCULES**

The Hercules Terminator Beast comes with 8M of onboard RAM and a 250MHz RAMDAC. At \$269, this card will be extremely competitive with current high-end cards such as the Matrox Millennium G200.

The 128-bit Savage3D chip can process up to 125 million pixels per second. The AGP engine has been redesigned and opti-

mised for Intel's LX and BX AGP chipsets. It also utilises trilinear filtering (most cards use bilinear filtering) and this dramatically improves image quality.

In 2D performance, our tests show the card to be comparable to, although slightly behind, the G200-powered cards from Matrox.

The Terminator Beast scored very well in the Ziff-Davis 3D WinBench 98 test, coming slightly behind the second-placed Asus AGP V3000ZXTV, but its performance in the Quake II tests was unimpressive.

Although our test results do not appear to back up Hercules and S3's claims of superior performance, it must be remembered that this is not the final version of the card, and as the drivers are new they are not fully optimised.

A more expensive version of this card with 16M of SGRAM and video output is on the way, and the distributor claims this will tweak performance by up to 15%.

- **Distributor** Peripheral Sources
- **Phone** (03) 9878 8611
- **Price** \$269
- **Online** <http://www.hercules.com/>
- **In short** This impressive new technology will heat up the battle for graphics chip supremacy.





## Specifications: Graphics cards

Product	Asus AGP-V2740	Asus AGP-V3000ZTV	ATI All-in-Wonder Pro	ATI Xpert 98	Diamond Stealth II 6460	Hercules Terminator 2x/i	Leadtek WinFast 3D S900
Distributor	Cassa	Cassa	BBF Components and Peripherals	BBF Components and Peripherals	Chips and Bits	Peripheral Sources	Tech-Excel Distribution
Phone	(07) 5445 2992	(07) 5445 2992	(03) 9761 4299	(03) 9761 4299	(03) 9696 1911	(03) 9878 8611	(02) 9417 7898
Online	<a href="http://www.asus.com.tw">http://www.asus.com.tw</a>	<a href="http://www.asus.com.tw">http://www.asus.com.tw</a>	<a href="http://www.bbf.com.au">http://www.bbf.com.au</a>	<a href="http://www.bbf.com.au">http://www.bbf.com.au</a>	<a href="http://www.diamondmm.com.au">http://www.diamondmm.com.au</a>	<a href="http://www.psiaust.com">http://www.psiaust.com</a>	<a href="http://www.tech-excel.com.au">http://www.tech-excel.com.au</a>
Price	\$199	\$299	\$949	\$249	\$297	\$256	\$310
Graphics processor	Intel i740	nVidia Riva 128ZX	ATI Rage Pro Turbo	ATI Rage Pro	Intel i740	Intel i740	Intel i740
Display memory and type	8M SDRAM	8M SGRAM	4M SGRAM	4M	8M SDRAM	8M SDRAM	8M SGRAM
Maximum memory	N/A	N/A	8M	8M	N/A	N/A	N/A
Maximum resolution/colour depth/refresh rate	1,600 by 1,200/65K/60Hz	1,920 by 1,200/65K/75Hz	1,600 by 1,200/16M/75Hz	1,600 by 1,200/16M/75Hz	1,600 by 1,200/256/60Hz	1,600 by 1,200/256/75Hz	1,600 by 1,200/16M/60Hz
Maximum 3D resolution/colour depth/refresh rate	1,280 by 1,240/65K	1,600 by 1,200/65K	1,280 by 1,240/16M	1,280 by 1,240/16M	800 by 600	800 by 600/65K/85Hz	1,280 by 1,240/16M/100Hz
RAMDAC speed	205MHz	250MHz	-	-	203MHz	230MHz	205MHz
AGP type	2x	2x	1x	1x	2x	2x	2x
Output types	VGA	VGA, composite video, S-Video	VGA, CATV, composite video, S-Video audio	VGA	VGA	VGA	VGA, composite video, S-Video
PCI version available?	No	No	Yes	Yes	No	No	No
Platforms supported	Windows 95, 98, NT 4.0	Windows 95, 98, NT 4.0	Windows 96, 98	DOS, Windows 3.x, 95, 98, NT	Windows 95, 98, NT 4.0	Windows 95, 98, NT 4.0	Windows 95, 98, NT
APIs supported	DirectX, OpenGL	DirectX, OpenGL	DirectX, OpenGL	DirectX, OpenGL	DirectX, OpenGL	DirectX, OpenGL	DirectX, OpenGL
Warranty	1 year	1 year	5 years	5 years	5 years	5 years	1 year RTB
Supplied software	None	VCD player, video capture, Incoming	G-Police, Incoming, Videowave	Shipwrecked, Ufi Photosuite	Incoming, Fremont 3D Data Visualizer	Hercules Touch, Hercules Entertainment Center	Asymetrix Web 3D, Asymetrix 3D F/X, Digital Video Producer, Platinum WIRL, VRCreator, VDOLive
DirectX version	6.0 Beta	6.0 Beta	6.0 Beta	6.0 Beta	6.0 Beta	6.0 Beta	6.0 Beta
Graphic driver	gfxdrv.drv 4.10.01.1610	nv3disp.drv 4.10.01.250	macxw4.drv 4.10.01.2411	macxw4.drv 4.10.01.2411	s2g460le.drv 4.10.01.1338	gfxdrv.drv 4.10.01.1617	gfxdrv.drv 4.10.01.1915
Flat shading/Gouraud shading	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable
Dithering/Z-Buffer	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable
Perspective correction	Capable	Capable	Capable	Capable	Capable	Capable	Capable
Nearest/Linear	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable
Nearest mipmap nearest/linear	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable
Linear mipmap nearest/linear	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable
Modulate/Decal texture blending	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable
DecalAlpha/ModulateAlpha texture blending	Capable/Capable	Not capable/Capable	Capable/Not capable	Capable/Not capable	Capable/Capable	Capable/Capable	Capable/Capable
Flatwrap texture addressing	Capable	Capable	Capable	Capable	Capable	Capable	Capable
Cylindrical wrap u/wrap v	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable
Clamp/Mirror texture addressing	Capable/Capable	Capable/Capable	Capable/Not capable	Capable/Not capable	Capable/Capable	Capable/Capable	Capable/Capable
Cull counterclockwise/clockwise	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable
Cull none	Capable	Capable	Capable	Capable	Capable	Capable	Capable
Fog vertex linear/Fog table linear	Capable/Not capable	Capable/Capable	Capable/Not capable	Capable/Not capable	Capable/Not capable	Capable/Not capable	Capable/Not capable
Fog table exponential/Specular highlights	Not capable/Capable	Capable/Capable	Not capable/Capable	Not capable/Capable	Not capable/Capable	Not capable/Capable	Not capable/Capable
Colour key/alpha transparency	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable
Source alpha/add pixel blending	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable
Modulate pixel blending/Alpha vertices	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable
Fog vertex and colour key	Capable	Capable	Capable	Capable	Capable	Capable	Capable
Fog vertex and alpha	Capable	Capable	Capable	Capable	Capable	Capable	Capable
Anti-aliasing/Texture swapping	Capable/Capable	Capable/Capable	Not capable/Capable	Not capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable
Narrow z/Wide z accuracy	Incorrect/Incorrect	Incorrect/Incorrect	Incorrect/Incorrect	Incorrect/Incorrect	Incorrect/Incorrect	Incorrect/Incorrect	Incorrect/Incorrect
High triangle count/Texture fidelity	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable
Winstone 98 Business Winstone	23.1	22.9	22.9	22.8	23.4	22.9	23.1
WinBench 98 Business Graphics WinMark	146.7	154.0	150.0	148.3	152.0	147.3	150.3
WinBench 98 High-End Graphics WinMark	176.3	195.7	178.7	178.0	178.3	176.0	175.3
3D WinBench 98 3D WinMark	789.0	931.0	686.0	663.0	825.0	755.0	771.0
Quake II test: Timerefresh (fps)	52.7	48.9	35.2	34.0	50.2	50.3	52.4
Quake II test: Demo1 (fps)	38.1	42.7	23.6	23.0	35.4	36.8	38.2
Quake II test: Demo2 (fps)	38.1	41.9	23.4	23.1	36.3	37.2	38.2

1. 'Incorrect' means that while a card's drivers claimed to support a certain feature, under our testing conditions the card was found to perform this feature incorrectly.

2. Winstone, WinBench and associated programs are registered trademarks of the Ziff-Davis Publishing Company.

3. The Matrox G200 cards did not have OpenGL drivers available for Windows 95 at the time of testing.



## Specifications: Graphics cards

Product	Matrox Millennium G200	Matrox Mystique G200	QDI Amazing-1 AGP 3D	STB Velocity 128	Diamond Viper V550	Hercules Terminator Beast
Distributor	Focal Point Computing	Focal Point Computing	Spear Technology	Alfa Computers	Chips and Bits	Peripheral Sources
Phone	(03) 9525 1144	(03) 9525 1144	(02) 9904 8199	(02) 9317 3344	(03) 9696 1911	(03) 9878 8611
Online	http://www.matrox.com/mgaweb/	http://www.matrox.com/mgaweb/	http://www.qdigrp.com	http://www.alfa.com.au	http://www.diamondmm.com.au	http://www.hercules.com
Price	\$335	\$335	\$110	Retail: \$339, OEM: \$269	\$449	\$269
Graphics processor	MGA-G200	MGA-G200	Intel i740	nVidia Riva 128ZX	nVidia Riva TNT	S3 Savage 3D
Display memory and type	8M	8M	4M SGRAM	8M SGRAM	16M SDRAM	8M
Maximum memory	16M	16M	8M	N/A	N/A	N/A
Maximum resolution/colour depth/refresh rate	1,800 by 1,440/16M/70Hz	1,800 by 1,440/16M/65Hz	1,600 by 1,200/256/75Hz	1,920 by 1,200/65K/75Hz	1,920 by 1,200/256/240Hz	1,600 by 1,200/16K/60Hz
Maximum 3D resolution/colour depth	1,420 by 1,080/16M/80Hz	1,420 by 1,080/16M/75Hz	1,240 by 1,200/16M/100Hz	1,600 by 1,200/65K/80Hz	1,920 by 1,200	1,024 by 768/65K
RAMDAC speed	250MHz	230MHz	203MHz	250MHz	250MHz	250MHz
AGP type	2x	2x	2x	2x	2x	2x
Output types	VGA	VGA, composite video, S-Video	VGA	VGA	VGA, composite video, S-Video	VGA
PCI version available?	No	No	No	No	Yes	Yes
Platforms supported	Windows 3.x, 95, 98, NT, OS/2	Windows 3.x, 95, 98, NT, OS/2	Windows 95, 98, NT 4.0	Windows 95, NT 4.0	Windows 95, 98, NT 4.0	Windows 95, 98, NT 4.0
APIs supported	DirectX	DirectX	DirectX, OpenGL	DirectX, OpenGL	DirectX, OpenGL	DirectX, OpenGL, Metal (S3 native)
Warranty	3 years	3 years	2 years	Lifetime	5 years	5 years
Supplied software	Micrografx Picture Publisher 8, Simply 3D 3, PointCast Imagination, Netscape Communicator	Motorhead, Incoming, Tonic Trouble, plus demos of Forsaken, Tomb Raider II, Ultim@te Race, Jedi Knight	Intel 3D demos	FIFA World Cup 98, Interstate '76, Battlezone (with retail version only)	Not yet announced	None
DirectX version	6.0 Beta	6.0 Beta	6.0 Beta	6.0 Beta	6.0	6.0
Graphic driver	mgapdx64.drv 4.10.01.4110	mgapdx64.drv 4.10.01.4110	gbxdrv.drv 4.10.01.1915	stbv128.drv 4.10.01.177	vprdrvle.drv 4.10.01.212	s3_6.drv 4.10.01.4000
Flat shading/Gouraud shading	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable
Dithering/Z-Buffer	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable
Perspective correction	Capable	Capable	Capable	Capable	Capable	Capable
Nearest/Linear	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable
Nearest mipmap nearest/linear	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable
Linear mipmap nearest/linear	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable
Modulate/Decal texture blending	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable
DecalAlpha/ModulateAlpha texture blending	Capable/Capable	Capable/Capable	Capable/Capable	Not capable/Capable	Capable/Capable	Capable/Capable
Flatwrap texture addressing	Capable	Capable	Capable	Capable	Capable	Capable
Cylindrical wrap u/wrap v	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable
Clamp/Mirror texture addressing	Capable/Not capable	Capable/Not capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable
Cull counterclockwise/clockwise	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable
Cull none	Capable	Capable	Capable	Capable	Capable	Capable
Fog vertex linear/Fog table linear	Capable/Capable	Capable/Capable	Capable/Not capable	Capable/Capable	Capable/Capable	Capable/Capable
Fog table exponential/Specular highlights	Capable/Capable	Capable/Capable	Not capable/Capable	Capable/Capable	Capable/Capable	Incorrect/Capable
Colour key/alpha transparency	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable
Source alpha/add pixel blending	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable
Modulate pixel blending/Alpha vertices	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable
Fog vertex and colour key	Capable	Capable	Capable	Capable	Capable	Capable
Fog vertex and alpha	Capable	Capable	Capable	Capable	Capable	Capable
Anti-aliasing/Texture swapping	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable
Narrow z/Wide z accuracy	Incorrect/Incorrect	Incorrect/Incorrect	Incorrect/Incorrect	Incorrect/Incorrect	Incorrect/Incorrect	Incorrect/Incorrect
High triangle count/Texture fidelity	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable
Winstone 98 Business Winstone	22.8	22.8	23.1	23.1	22.80	22.73
WinBench 98 Business Graphics WinMark	162.3	161.0	151.3	149.3	161.67	157.67
WinBench 98 High-end Graphics WinMark	211.0	211.7	175.7	189.3	202.67	200.33
3D WinBench 98 3D WinMark	805.0	886.0	756.0	873.0	1,260	898
Quake II test: Timerefresh (fps)	N/A*	N/A*	50.4	49.3	112.25	60.07
Quake II test: Demo1 (fps)	N/A*	N/A*	37.2	39.9	56.84	34.07
Quake II test: Demo2 (fps)	N/A*	N/A*	37.0	38.0	54.12	33.42

1. 'Incorrect' means that while a card's drivers claimed to support a certain feature, under our testing conditions the card was found to perform this feature incorrectly.

2. Winstone, WinBench and associated programs are registered trademarks of the Ziff-Davis Publishing Company.

3. The Matrox G200 cards did not have OpenGL drivers available for Windows 95 at the time of testing.



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# Workshop

141 APC Magazine

CONTENTS

**W**elcome to Workshop, the section dedicated to bringing you all manner of tips, interesting information and do-it-yourself tutorials. Within these pages you will find useful shareware, informative operating-system-specific columns and easy-to-follow programming tutorials.

This month was a little dry in the Bug of the Month submissions — keep on looking to win a prize! We've had some excellent submissions so far, and with Windows' propensity to crash, there must surely be many more out there.

Also on the news front, the *Linux Pocketbook* goes on sale this month. If you've been considering trying Linux out, but have been put off by bulky Linux books and the steep learning curve, the *Linux Pocketbook* will tell you everything you need to get started in a clear and concise manner.

The book even comes with a selection of the latest and best Linux programs and a copy of the popular Red Hat Linux distribution — a complete, free operating system on the cover CD! Look out for it at your favourite newsagency.



## Win! Win! Win!

Workshop is on the lookout for the most interesting, strange, funny, or downright weird software bugs you can find. These include code snippets, examples of features that function poorly, or procedures for crashing a particular application. Anything and everything that is buggy deserves mention.

Send us the bug of your choice via email to [bugs@apc.com.au](mailto:bugs@apc.com.au) or snail mail, and you'll be in the running to win your choice of **development or application software** prizes from Workshop's software collection. The prizes change each month to ensure there's always something interesting for avid bug-hunters. Feel free to send screen captures or example code listings, as well as details of how to duplicate the bug, if applicable.

Winners will be announced in the December edition of APC, and the winning bug will appear in the Bug of the Month column. So start hunting!

## Tech Talk 142

Technobabble explains the inner workings of your graphics card, while Step by Step ponders the upgrade cycle, and which parts you should consider upgrading first.

## Operating Systems 152

Windows 95 shows you how to patch up those much publicised security flaws, OS/2 takes a look at stabilising Win-OS/2, Mac OS examines the state of Java, and Linux guides you through the steps required to set up an email server.

## Programming 162

Developers Corner returns to the topic of pointers, JavaScript rounds off the entire series (something not to be missed), and HyperText totes the benefits of marginal attributes.

## Shareware Summary 168

All the files mentioned here can be found on this month's **apcmag.cd** in the Workshop section.



## Bug of the Month

Well, it has been a lean month for bugs. I'm afraid that making the Word 97 thesaurus say a rude word is not really a bug — and neither is the Excel 97 Easter Egg. To the APC staff who are betting on which of those two will be the first to be reported by 500 different people, the Easter Egg is narrowly in front.

George Koungoulos, this month's winner, can probably count himself lucky. Getting Microsoft software to crash by giving it outlandish input is a bit like shooting fish in a barrel . . . using an M16 . . . after draining the water out first. However, since my long-suffering editor insists on giving away expensive software, George wins the 'Best of a Bad Bunch' prize.

Microsoft Telnet allows you to set the number of rows saved in its buffer. The help screen says this must be a number between 25 and 399. George, our intrepid adventurer, set this to 3,000. Telnet collapsed into a title bar, with no display area at all. Restarting the program didn't remedy the problem: the program continued to operate in its miniature mode. The only solution was to change the registry, using Regedit. Seriously ugly programming.

As with all BOTM winners, George gets to choose a prize from Workshop's software and reference collection. And my editor remains satisfied for another month. Ain't life grand?

Michael Smith

## Get involved

All files mentioned in Workshop can be found on **apcmag.cd** or downloaded from our Web site at <http://www.apcmag.com>. Here you will also find a number of online discussion forums where you can discuss technical issues or just voice your opinion on any related topic.

Don't forget that Workshop is a reader-input section. Feel free to contact us by sending any ideas, comments or criticisms to [workshop@apc.com.au](mailto:workshop@apc.com.au), or send snail mail to Box 37, Sydney NSW 1028.



Part one of our series on one of the more important devices in your system: the graphics card. **By Nathan Taylor**

## Technobabble

**F**or best system performance, graphics cards have become critical components. Consumers have begun to learn that their current systems are quite capable of doing most common tasks — word processing, Internet surfing, account management and so forth. The only truly demanding tasks for consumer PCs nowadays are primarily graphical ones, particularly involving 3D graphics. That's why it has become popular to simply upgrade the graphics accelerator, rather than the processor or the whole PC.

These days, the terms 'graphics card' and 'graphics accelerator' are used interchangeably. This was not always the case. There was once a big difference between the two.

Early graphics cards simply acted as an intermediary between the CPU and monitor, essentially passing the information from the CPU to the monitor. The job of determining where each pixel went was left completely to the CPU. Essentially the CPU would deliver a frame in the form of a bitmap to the graphics card, which would then convert it to something the monitor could understand.

This was all fine when we just used text-based graphics like DOS and Unix, which didn't tax the CPU too much. The advent of the graphical user interface (GUI) changed all that, however. Here we had a graphics-intensive environment which required heavy processing power to keep up-to-date with the user. This resulted in the creation of what were known as graphic accelerators (sometimes called *Windows accelerators*).

Whereas previously the CPU determined what image appeared onscreen, now the graphics card helped with common tasks, like line drawing, for instance. If you wanted a line between screen coordinates (345,450) and (380,450), the CPU would normally have had to issue 35 commands to the graphics card, one for each pixel in the line. With the new accel-

erators, it could now just issue one, saying 'draw me a line between these two points' to the accelerator.

In recent years, graphics accelerators have developed even further. Most modern accelerators incorporate some sort of hardware acceleration for playback of motion video, and even some features which take the burden off the CPU when processing 3D graphics (which we'll look at in more depth next month).

The result is that a lot of your system's performance now depends on the graphics accelerator card in your PC. The era of 3D games has really brought this home, and now there are even whole fan sites devoted to particular types of graphics accelerators, with detailed listings of specifications, hardware acceleration features and up-to-date news and gossip.

Graphics accelerators usually come in the form of an add-in card for the PC, although occasionally they are simply chips embedded in a system's motherboard. They have a number of compo-

nents, the most important of which is the *chip* or *chipset*.

Like the computer's CPU, the control chip or chipset (sometimes it's a single chip, sometimes it's a group of chips working together) takes care of the processing requirements of the accelerator. If it is issued a command to draw a square, for instance, the chipset figures out which pixels are affected and what to do with them. Like CPUs, not all chips and chipsets are created equal. Take a look at this month's graphics card feature (on page 127) to find the one that's best for you.

Most graphics cards also require some kind of memory system, called the *video memory* or *frame buffer*. This memory is commonly used to store the next frame of data, ready for output to the screen. When it wants to change something on the screen, the graphics chip(set) simply modifies the contents of the memory. In the early days of graphics cards, when graphics controller chips were minimal-





ist, to say the least, programmers would write programs that directly changed the contents of the frame buffer, thus determining the output on the screen.

The size of the frame buffer determines the maximum resolution the graphics card can output. If it is only large enough to store a 1,024 by 768 bitmap, for instance, then that is the maximum resolution of the screen. In newer cards, other features, particularly 3D features, also compete for memory space with the next screen frame. That's why a 4M Voodoo graphics card (a 3D card) can only go to 640 by 480, but a 4M Matrox Millennium card (primarily a 2D card) can reach 1,600 by 1,200 in 2D mode.

A few years ago, several vendors including Cirrus Logic played around with a concept called the *unified memory architecture* (UMA), which used the computer's main memory, instead of dedicated graphics memory, for storing frames. This was done in order to save costs on graphics cards, which normally have their own dedicated memory. It turned out that this was way too slow — graphics memory is usually purpose-built (and, like system memory, comes in many flavours), and is much faster for the graphics chip to access than main memory. It also took up a chunk of system memory. As a result, UMA died a quick death, although some of the principles behind it survive in Intel's *Accelerated Graphics Port* (AGP), which can use main memory to store some data required for 3D graphics, rather than the card's own memory.

(As an adjunct, many vendors use terms like '64-bit' and '128-bit' to describe the performance of their cards. This actually describes the bandwidth to its own internal memory, and is not really a good indication of performance. It does not refer to how well the device will communicate with the rest of the system.)

The next component in the chain is the *RAMDAC* (random access memory digital-to-analog converter). Often integrated into the main chip(set), the RAMDAC has the task of sucking the next frame from the frame buffer and converting it to the analog signals required by the monitor. Of course, older digital display systems, such as monochrome monitors, do not require a RAMDAC.

The speed of the RAMDAC generally determines the maximum refresh rate produced by the card. A fast RAMDAC will be able to take more frames, or higher resolution frames, from the frame

buffer in a given period of time. A fast RAMDAC is essential if you want really high refresh rates from your graphics card.

Graphics cards will also have a *Basic Input/Output System* (BIOS), which enables the graphics card to be initialised on system start-up (rather than when the operating system calls upon them) and provides a set of functions used by software to access the system hardware. It works in pretty much the same way the system BIOS works for the system chipset, translating software calls into hardware functions.

## Introducing VESA

Because different cards have different BIOS functions (even some cards using the same chipset have different functions), a group called the *Video Electronics Standards Association* (VESA) devised a standard set of functions to provide software developers with maximum compatibility between devices, rather than requiring that they develop applications which support specific devices. Most modern cards support these functions, called the *VESA BIOS Extensions* (VBE) within the BIOS, although a few cards still require a software translation program, such as SciTech's *Display Doctor*, to be able to support the functions.

The latest VBE version is 2.0, and we do not recommend graphics cards that don't support this standard in their BIOS. Although in Windows it is largely irrelevant (Windows uses device-specific drivers to make developing non-hardware-specific applications possible), many DOS games and applications still use VBE to provide high-resolution graphics.

Finally, graphics cards also include various ports, connectors and switches that connect them to other computing devices. In addition to monitor output, many recent video cards have a number of external ports, including ports for output to television (either composite video via RCA cables, or S-Video), loop-throughs for additional graphics cards, and proprietary and standards-based connectors for add-ons such as memory upgrades.

There are several standards for connectors to video add-ons which require high-bandwidth direct connections to deliver data to the graphics card, such as television tuners, DVD decoders and video capture devices. Designed to connect to other devices inside the com-

puter, these include the standard feature connector, a 26-pin connector for transfer of low-resolution graphics; the *VESA Advanced Feature Connector* (VAFC), an 80-pin extension to the feature connector, which provides higher resolution image transfer; and the *VESA Media Channel*, a 64-pin channel for interfacing together multiple video streams. Despite the existence of these standards, many vendors persist in using proprietary connectors for add-ons, presumably so that the only devices that can be easily used with the card are those from the vendor that developed the card.

There are several other ways add-on board vendors can mix their video stream with that of the graphics card. Many, such as 3D-only graphics chip maker 3Dfx, use a method called video overlay. Essentially, video overlay uses an external loopback system. The cable from your primary (2D) graphics card, instead of going to the monitor, actually goes to the add-on card, which 'overwrites' the video stream where required, before then forwarding on the edited video stream to the monitor.

This method does suffer from a few problems. First is the slight signal decay from the loopback, which reduces the quality of the original output ever so slightly. It must be said that most people can't even notice this. The other, more pressing problem is the alignment of the graphics on the screen — they're often slightly askew because the add-on card doesn't know *exactly* in which part of the frame its signal is meant to appear (especially when it's set to appear in a window). Sometimes this requires the user to manually calibrate the position of the overlay on the screen. At other times vendors avoid this by simply overwriting the whole frame with the output from the add-on card and running the add-on full screen, although this prevents applications from running in a window.

An alternative to video overlay was developed by US company Quadrant. Called 'video inlay', this technique allows the add-on card to write directly into the frame buffer of the card, via the normal system buses (such as PCI). While this overcomes some problems with video overlay, some graphics cards do have problems with the technique, so it's best to test before you buy.

---

**Next month: Graphics standards and buses.**



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4. The Small Business Show reserves the right to retain each entry software package for consideration for future stories for the program and therefore will not be returned to the entrant. For this reason we suggest that each entrant ensures they retain original disks and manuals.

5. Entries must be received by The Small Business Show no later than 5pm, Monday, November 9. This is an absolute deadline. Entries received after this date will be ineligible for judging.
6. All individuals and companies who entered the Awards in 1995, 1996 and 1997 are eligible to enter again this year.
7. Employees of the Nine Network and Australian Consolidated Press or any associated companies and their families are ineligible to enter the competition.
8. The software will be judged on its functionality, local and international market potential beginning with ease of loading, its system requirements and performance. Ultimately, the judges are seeking a product with worldwide market potential.

A representative of The Small Business Show or the judging panel will contact you if further information is necessary.

Entries close strictly at 5pm., Monday, November 9. All entries are maintained under strict security. The finalists will be announced on the Nine Network's The Small Business Show on Sunday, November 29. The winner will be announced on Sunday, December 6. Send your entry to: Software Awards, The Small Business Show, Nine Network, P.O. Box 27, Willoughby, NSW 2068

Full name of applicant/business: \_\_\_\_\_

Name of software package: \_\_\_\_\_

Format/platform: \_\_\_\_\_

Business Address: \_\_\_\_\_

Tel/Fax: \_\_\_\_\_

Contact name: \_\_\_\_\_

Entry category: Main ☐ Main & Internet ☐ Australia-Specific ☐

Name/s of developers: \_\_\_\_\_

Time frame and Location of development: \_\_\_\_\_

Is software package on the market (tick answer) YES ☐ NO ☐

Brief description of software package, its application and the market for which it has been created: \_\_\_\_\_

Declaration: I/we agree to accept the entry criteria set for the Business Software Awards and that the decision by the judging panel is final.  
Managing director/general manager/director (print name and sign)  
Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Entry Form



*What should you upgrade to get the best bang for your buck?* **By Daniel Rutter**

# Step by Step

**L**et's assume you're starting out with a machine that was pretty speedy a year or so ago — a Pentium 166 with 32M of RAM, a 1.6G hard drive and a generic 2M video card. Second-hand machines at this spec level are available all over the place for between \$500 and \$1,000, depending on the type of monitor, printer and so on. What do you have to do to this computer to get it up with the frontrunners?

## CPU power

For plain old business computing, a 166MHz or 200MHz Pentium (plain or MMX version) is quite adequate. MMX processors are 10% to 20% faster in ordinary use than equivalently clocked non-MMX Pentiums. This small difference does not justify the upgrade.

A Pentium II processor will run business apps faster, but unless you're doing gigantic spreadsheet and database work, you won't see much difference — you certainly won't get value for money.

If you're into graphics, CPU power is much more important. Two-dimensional paint and manipulation programs like Photoshop and 3D rendering programs like 3D Studio can use all the power you can give them. For 2D you can make do with a slow Pentium, since the real number-crunching only happens when you're applying effects and most operations are much less demanding. For 3D, though, you need processor power in direct proportion to the complexity of your jobs divided by your patience. For both final and preview rendering, no processor is too fast.

Games are also demanding on CPUs. Computer games can be broadly divided into 3D — things like Quake and flight simulators — and 2D. Generally 2D games don't put great demands on modern hardware, and the abovementioned modest machine should be quite adequate.

Intel Pentium machines are a little faster than AMD K6 machines at the same clock speed for Quake and Quake II, because these games are optimised for the Pentium floating point unit (FPU), which is more sophisticated than the otherwise superior K6s. Since the K6 is a cheaper processor than the Pentium, though, you

can afford to compensate by buying a faster K6 for the same or less money. For non-optimised programs, the K6's FPU performance is much the same as that of a Pentium at the same speed.

Other low-cost CPUs like the IDT Win-Chip and, to a lesser extent, the Cyrix/IBM 6x86MX are not well suited to 3D gaming applications. They don't come with very high clock speeds, and their FPUs are not as fast as those of Pentiums, let alone of Pentium IIs. They're a great choice for a business machine and are fine for less demanding gaming.

The current cheap CPU of choice in the 3D gaming world is the Celeron, Intel's cut-price Pentium II processor with no level 2 cache RAM. A 266MHz Celeron performs like a 233MHz Pentium for business pur-



poses, but is almost as fast as an equivalently clocked full Pentium II for 3D games.

The absence of cache RAM makes the Celeron very overclockable — you can run it much faster than it's meant to go. Overclocking is a column in itself, and has been previously covered in Step by Step (see APC May, page 165). There will be an update, most definitely covering the Celeron, in the near future.

## Motherboard

You'll probably need a new motherboard if you decide to go for a CPU upgrade. In the last few years, both Socket 7 (Pentium, K6 and other low-cost processors) and Slot 1 (Pentium II and Celeron) motherboards have gained SDRAM support, Ultra DMA EIDE hard disk controllers for the current generation of superfast cheap drives,

Advanced Graphics Port slots for cheap 3D video cards, and other mod cons like USB and infra-red data transfer support. They also now operate reliably at 100MHz CPU bus speed.

For everyday computing, none of this matters. If your current board supports a CPU fast enough for your needs, changing it for a topnotch motherboard will give you a speed boost of only a few percent overall. You need only buy a new motherboard if some other upgrade requires it.

## Video

Again, if you're interested in running plain old office applications, any current video card will do. If you want to use a big monitor, investing in a card that is capable of high resolutions (1,024 by 768 and higher) at a refresh rate of 72Hz or better is a good idea. Grabbing one or more extra video cards and monitors to take advantage of Windows 98's multiple monitor support is another productivity booster. But none of this makes the computer any faster.

If you're into 3D graphics — rendering or games — you've got good reason to upgrade your video hardware. A year ago, the only choice for fast 3D gaming was a 3Dfx Voodoo-based graphics card, from any one of a number of manufacturers. This has since been supplanted by the Voodoo2 chipset. Both 3Dfx cards sit next to your old graphics card and only do anything when you're playing a 3D game.

There are several other products from different sources, such as Matrox's MGA-G200 based Millennium and Mystique and various cards incorporating the Intel740 chipset, which also beat the Voodoo chipset's performance.

At the time of writing, the G200-based cards look to be an excellent choice for most users, providing really fast 2D graphics and very high-quality 3D for serious rendering and games. Voodoo2 cards beat the G200's speed, but they're good only for games, are more than twice as expensive, and still require a regular 2D card. 3Dfx's competitor in the G200's class is the Voodoo Banshee range, which has most of the 3D performance of the Voodoo2 cards and fast 2D as well.

For most purposes, a G200-class card





Picture showing NEC's innovative Chroma Clear CRT used in ViewMaster 17" (ChromaClear) Monitor.

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15"	13.6"	0.28mm	85Hz	85Hz	60Hz	-	-	-
17" (OSD)	16"	0.28mm	85Hz	85Hz	85Hz	75Hz	60Hz	-
17" (ChromaClear)	16"	0.26mm	85Hz	85Hz	85Hz	75Hz	60Hz	66Hz
19"	18"	0.26mm	85Hz	85Hz	85Hz	85Hz	60Hz	75Hz



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will be more than fast enough for literally any task, and will deliver good performance with any processor from a Pentium 200 up. More committed gamers will stick with the Voodoo2, and the most committed gamers will want a pair of Voodoo2 cards in their 'scan line interlaced' mode, for truly ludicrous speed.

## RAM

The big upgrade item for Windows boxes was, and still is, memory. With 128M of PC100 SDRAM (the fast stuff that's guaranteed to work with 100MHz processor bus speeds, as used by the latest chips) costing only about \$400 at the time of writing, a ton of RAM is now a relatively cheap item. The EDO SIMM memory used by older motherboards is even cheaper — about a 20th of its 1995 price!

If you want a faster Windows computer, adding RAM is a decent idea pretty much regardless of your current configuration. The more RAM you add, though, the less extra benefit you'll see; a 128M Windows machine will perform better than a 96M one, but not nearly as much as a 64M machine compared with a 32M one.

Upgrading plain old SIMM RAM to SDRAM is a poor choice — you'll get about a 5% to 10% overall speed increase. SDRAM's big feature is its ability to operate in computers using fast bus speeds — 83 or 100MHz. If you're not using these bus speeds — in other words, if you're not using a 300, 350 or 400MHz processor, or fiddling with overclocking — plain SIMMs will do.

## Hard disk

In normal operation, the speed of your hard drive has little effect on the speed of your computer. If you make your hard drive twice as fast, you can expect about a 10% overall speed boost. Adding lots and lots of RAM, allowing a really big disk cache, will

do more for the performance of most disk-flogging tasks than upgrading the drive.

There are exceptions, though. Network servers that have to deliver tons of data to multiple clients all the time will perform better with faster storage. And so will video editing machines — though current consumer hard drives are now more than fast enough for semi-professional video editing.

When you need monstrous speed, you need a RAID (redundant array of independent disks) storage system. RAIDs are built on special controllers, which are traditionally SCSI, although a couple of EIDE RAID controllers are now available. These allow data to be shared among different drives in a variety of ways. So, for example, four identical drives can have data 'striped' across them to increase performance, or data duplicated between them for greater reliability.

For most applications, though, a RAID is monstrous overkill. If your hard disk storage is sufficient for your needs, don't worry about it. Upgrade if you need more space, but leave the drives alone if you're looking for more speed.

## Internet

If your Web browsing isn't fast enough, your best bet is to move to the US. Australian Internet access, by and large, is slow. The numerous bottlenecks between an Australian Web surfer and most destination sites limit the number of bits available to you per second, no matter how fast your connection is.

Fortunately, emigration is not your only option. If you have a modem slower than 28.8K (the V.34 standard), upgrading is a good idea. 33.6K (V.34bis) modems connect a little faster, on average, than plain V.34, provided your Internet Service Provider (ISP) supports them. But it's not worth upgrading if you've already got V.34.

The latest 56K modems also need to be specifically supported by your ISP. Unfortunately, there are three kinds, and your ISP must use the same kind of 56K as you. The official standard is called V.90, and was only defined in February this year. Rockwell's earlier 'K56' and US Robotics' x2 modems are mutually incompatible, and are incompatible with V.90, although many current 56K modems are software-upgradable from one of the earlier standards to V.90.

Also, 56K modems only offer speeds above 33.6K in one direction — from the ISP to you. The ISP has to use special modems at their end to do this. Two ordinary 56K modem users can only connect to each other at V.34bis speed. You'll probably also never see the full 56K speed, because of line noise.

If you can afford it, try a 'cable modem' — an adapter box that allows data to be sent down cable TV wires. At the moment, Telstra's Big Pond Internet via Foxtel cable is the only Australian option in this department, and it gives you the thick end of a megabyte per second of download bandwidth and most of that the other way. You'll need an Ethernet network card and \$495 for the cable modem, and Telstra is still charging for every megabyte of data transfer over its monthly 100M limit, but most users should still get away for well under \$100 a month on top of their regular cable fees.

## What about sound?

Changing your soundcard can actually make your computer faster, now that games routinely support fancy 3D positional audio. Positional audio and other high-powered effects are supported in hardware by newer cards, but otherwise have to be software emulated. Most sound upgrades have more to do with quality than with speed, though, and I'll deal with those in next month's column. ■

## Applications

Component	2D games	3D games	3D rendering applications	2D graphics applications	Business applications	Network server
CPU	Pentium 200	No limit	No limit	No limit	Pentium 200	No limit
RAM	32M	64M	No limit	No limit	64M	128M
Video card	Any	Voodoo 2	Matrox G200 or similar accelerator	Any that supports the desired graphics modes	Any	Any
Hard disk	Any	Any	Any	Any	Any	RAID array

This table lists the minimum specification level for each major computer component required for good performance. A system with above-spec hardware for a given task may have a small performance edge, but not enough to justify the expense for most users. 'Any' denotes any currently available hardware. 'No limit' means you can't have too much in that department.



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*Windows 95 isn't the most secure platform, but there are ways to patch up the holes. By Kieran McNamee*

## Windows 95

**W**indows 95 is renowned for its poor security. Those requiring a secure platform are usually advised to choose a more professional operating system. If you are sticking with Windows 95, however, there are a number of ways to improve its security.

There are numerous security vulnerabilities that can be a threat to Windows 95 users. These include unauthorised user logons, changing system settings, and network holes that allow hackers access to files. A secure system will limit changes that can be made to the Windows 95 shell, protect files on the hard drive, limit which programs can be executed and prevent unauthorised network access to resources.

Windows 95 will never be as secure as more professional operating systems, but if you would like to increase Windows 95's security then read on.

### The system policy editor

The system policy editor is an important tool for those wishing to beef up the security of Windows 95. This utility must be installed from the Windows 95 set-up CD-ROM separately, or it can be downloaded from <http://www.microsoft.com/windows/download/POLICY.EXE>. Through the

Windows Setup panel in Add/Remove Programs, the system policy editor can be installed by clicking on 'Have Disk...' and by specifying the admin\app-tools\poledit directory on the Windows 95 CD-ROM. To load the system policy editor, type poledit in the Start Menu's Run option.

Using the system policy editor you can create policies determining what a user can do or how a computer is set up. The settings within these policies range from the type of wallpaper displayed, to the ability to access certain parts of the Control Panel. Policy changes can be made straight to the registry or, if there are multiple users on a network, a policy file can be created that will be automatically downloaded each time the user logs on.

### Passwords

One commonly held belief is that the Windows 95 log-on screen will prevent unauthorised people from accessing the system. The fact is that the username and password that is entered simply identifies the user and sets up the user interface with their preferences.

Many system resources as well as the data on Windows 95 systems can be password-protected. Particular care should be taken with passwords in a business situation where there is critical data at stake. For home PCs the risk is not so great, but if you have any password-protected data it is nice to know that no-one is likely to gain access to it.

Passwords should be alphanumeric and have at least five characters. These sorts of restrictions can be specified in the system policy editor. Network administrators should also set a



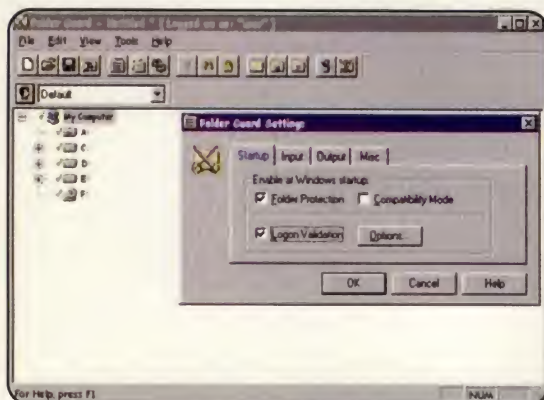
policy that passwords should be changed after a certain period of time.

The password-caching scheme used by Windows 95 is the source of a major network security problem. Password-caching involves recording passwords when they are used to access password-protected resources. These passwords are cached in the password list file for the user, then every time the user logs into Windows the password-protected resources can be accessed automatically.

The problem arises when hackers gain access to the password list file of a user. This file is encrypted, but a flaw in Microsoft's implementation of the RC4 encryption makes some files easy to decrypt. Password caching can be disabled through the system policy editor or by entering the following key in the registry:

```
HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Policies\Network\DisablePwdCaching = 1.
```

Disabling password-caching reduces the risk of unauthorised users using your passwords to gain access to password-protected resources. However, you will have to enter your passwords each time a resource is accessed.





## Networks and file sharing

When a Windows 95 machine is connected to a network, additional security problems arise. The main problem with networks is the opportunity they provide hackers to gain access to a system's files. The file-sharing mechanism of Windows 95 allows direct access to drives and printers connected to the network. This is why file sharing should be disabled where possible, or there should at least be strong passwords in place to prevent unauthorised access.

The problem with file sharing is not limited to business networks with multiple nodes. The home user connected to the Internet is also at risk. Experienced hackers can utilise your IP address to gain access to your system. If file sharing is enabled on your system, be sure to specify passwords for all shared drives.

Windows 95 provides share-level and user-level security for protecting shared resources on computers with File and Print Sharing services. These controls can be initially enabled in the Control Panel's Network option. If neither of these security controls are put in place, then any user on the network can gain access to the shared resource.

Share-level security protects shared network resources with individually assigned passwords. A single password for read-only access or full access can be

Properties from its right-click menu.

User-level security protects shared network resources by requiring that the user wishing to access the resource is specified on a list of authorised users.

## Patches and bug fixes

There have been numerous network security flaws found in Windows 95; they even have their own names: Teardrop, ICMP and the Winnuke, just to name a few. All of these flaws can be exploited by hackers on a network or the Internet.

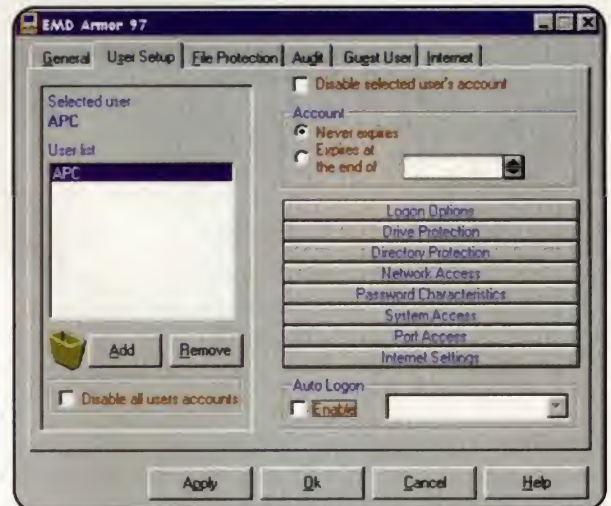
To fix these problems you should install the Windows 95 update to the TCP driver, which can be found on **apcmag.cd**.

## Third-party security applications

Once you have cranked up the security of Windows 95 to full power, there is still another precaution you can take — a third-party security application. There have been many security applications created to compensate for the poor security features of Windows 95. A few of the better shareware and freeware security applications looked at below can be found on **apcmag.cd** this month.

**StopLight 95 ELS** is an effective and easy-to-use security package from Safetynet Security. It activates during the boot-up process and displays a chunky DOS-like log-on screen. The administrator can set trustee assignments for each user with certain rights for accessing drives, directories and files. These rights include read, write, create, delete and execute. There are also privileges that can be defined by the administrator at a global or user level. Privileges override trustee assignments and include precautions such as disabling floppy disk facilities and enabling a keyboard lock when the screensaver is activated. Up to 255 users can be supported by StopLight, and activities of each user can be logged.

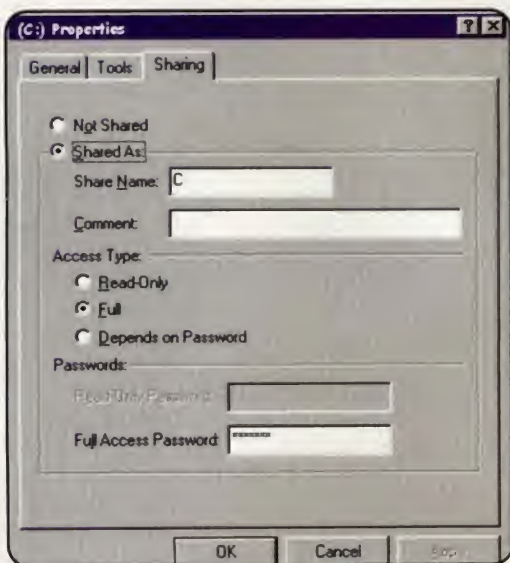
**PC Lock 98** allows you to place a multitude of restrictions on the Windows



95 environment. Loading with Windows 95, as opposed to before it, users must enter their username and password before gaining access to the system. PC Lock can disable access to the Control Panel, Start Menu, Taskbar, System Tray, and much more. The administrator can define which restrictions fall upon which users, but this must be performed through a less-than-perfect wizard-style interface. A handy feature of PC Lock is its ability to lock the system after Windows 95 has loaded by clicking on the icon in the System Tray.

**Folder Guard** is a security application that allows you to control access over drives and directories. Folder Guard's interface is very impressive. Drive and directories form a tree structure, allowing different areas to be easily made visible, hidden or restricted. Directories can be hidden from all applications, or they can be made visible to some but not to others. Access rights to Windows 95 items, such as the Start Menu and Control Panel can be limited for individual users. A log-on validation feature is another impressive feature of Folder Guard. This allows the log-on box that appears when Windows 95 starts to be altered. Options include disabling of the Cancel button, requiring a username or password to be entered, and hiding the previous username.

**EMD Armor 97** is certainly the pick of the bunch. Its features are endless, including access management, Internet security, protection of drives, prevention of COM port use, and virus protection. Armor 97 displays a DOS-like log-on screen before loading Windows 95 and multiple users can be set up, each with their own specific privileges. Be sure to check this one out.■



specified, or there can be a separate password for both. Those wishing to use shared resources with share-level access must know the individual passwords for each resource. Setting passwords for each resource can be performed by selecting



*This month we look at maintaining a healthy Win-OS/2 session.*

**By Christopher Relf**

# OS/2 Warp

## Efficient and safe Win-OS/2

All of the top brands have migrated their wares to Windows 95 by now — so what? We have two options: either port the Win32 program to native OS/2 (sure, it's not easy and won't work with everything, but it's an option); or realise that that new version of Word doesn't really have any extras you need. Many OS/2 users are coming to grips with the latter option, because new versions of programs may have prettier icons, menu bars and such, and a few features are added, but do you really need those options?

The answer is often 'no'. This month we look at firing up the old Win-OS/2 session, and making it really work for us. I can hear many of you thinking 'I tried Win-OS/2 once, and although it was better than Windows 3.x, it was still susceptible to the odd General Protection Fault'.

GPFs are a major problem that Windows and Win-OS/2 users have to face every day. Well, let's try to make your Win-OS/2 sessions more stable, and hence more reliable.

## The GPF

Nothing brings a user to tears more quickly than a GPF. If you encounter one, just hope that your last autosave worked. A GPF occurs when Win-OS/2 tries to access a segment of the memory that has been corrupted. This corruption can be caused by several things, but most often by another program, or even Win-OS/2 itself.

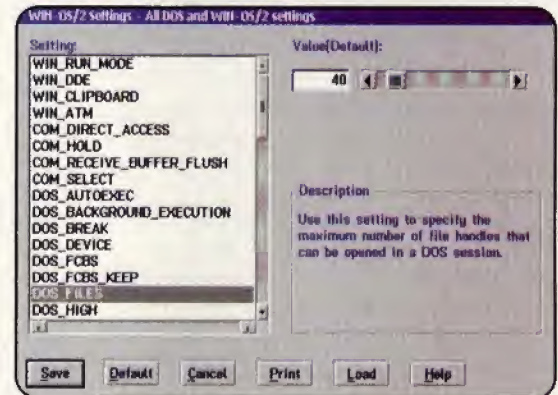
What actually happens is one of four things: Win-OS/2 gets confused and loads the wrong swapped block into the RAM, another program overwrites memory that you are currently using, the virtual memory (the swapfile in OS/2) becomes corrupted, or Win-OS/2 just runs out of resources. Occasionally more than one of the errors can occur simultaneously, although you only need one to bring the system down. OS/2 users may think that they are immune from the GPF, but that is only because we call it something different; ever had a SYS3175 error flash up on your screen? If a GPF occurs in a Win-OS/2 session, then that session is usually

toasted. Don't even think about continuing! Occasionally (on a good day) Win-OS/2 will allow you back into the session, but don't be tempted to continue on merrily as if nothing had happened. GPFs happen for a reason; save your work (if you can) and get out. Then, if everything else seems OK, start a new session.

## Separate Win-OS/2 sessions

One of the great features of OS/2 is the ability to run several Win-OS/2 sessions simultaneously. If a GPF should occur in one of them, the programs running in the other sessions are saved. If you are running Win-OS/2 programs from their OS/2 icon startup (you're not using the Win-OS/2 Program Manager) then you can set each power-hungry program to start up in its own Win-OS/2 session.

First, open its Settings notebook. Then, under the Session tab, enable the Separate session option. There are also

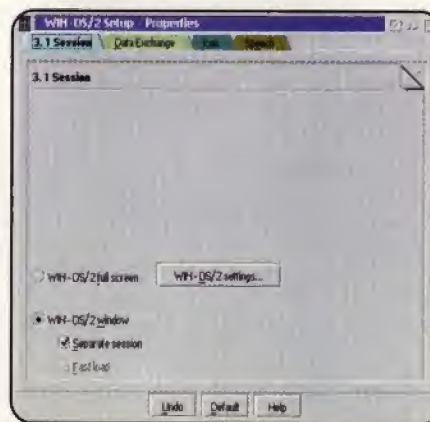


## Win-OS/2 resource problems

Win-OS/2 often has a problem with resource constraints. Even if you're running it on a 486 with 8M of RAM, Win-OS/2 often expects ample resources, but doesn't ask if they exist first. When problems arise, it's often too late to recover the Win-OS/2 session, and you get a GPF message. Unlike OS/2, error handling is *not* proactive, but reactive. Fortunately, there are a couple of things that you can do to minimise the resource-starved GPF.

One of these is to ensure that the Win-OS/2 session has plenty of DOS Protected Mode Interface (DPMI) memory. As any OS/2 user will know, Windows requires DOS to operate, and hence when we open up a Win-OS/2 session, it is in fact a DOS sessions supporting a Win-OS/2 session (how confusing!). If you use memory-hungry applications (like Word, Excel, Access) then setting the DPMI memory to 64M is not at all excessive because the program doesn't actually use it until it needs it.

You will find this option, as before, under the Settings notebook. You will want to adjust this setting for all Win-OS/2 sessions, so open the Win-OS/2 settings notebook, not the individual Windows programs you intend to use. Then, under DOS Memory Settings, adjust DPMI\_MEMORY\_LIMIT to 64M. You could set it to a lower value, but as mentioned before, the Win-OS/2 session won't use the full 64M until it actually needs it. With OS/2 Warp 3, the maximum DPMI setting was 64M, but with Warp 4 you can take it up to 512M if you like (of course, that would be completely excessive).



several other bits and pieces that you can tweak in the Settings notebook, and some of these will also stabilise Win-OS/2 sessions. If you have a few small programs that can be run together (say, File Manager and Notepad), then simply open them from a Win-OS/2 Program Manager shell. Running separate Win-OS/2 sessions can be CPU intensive, so it's a good idea to keep the little ones together.



## Win-OS/2 getting confused

I know of a fellow who once had a GPF in a Win-OS/2 session, and then, after starting numerous new sessions, was finally brought down by multiple GPFs. He subsequently swore off using Windows programs ever again, until his problems were solved using a little trick.

You may notice that when working on a Word document a temporary document is created (preceded with a tilde) — it's a great idea. If you do get a GPF, then the next time Word is opened it will (theoretically) recover the temporary file, and restore it to its former glory. Windows does the same thing. It creates many temporary files for many different reasons. Most of these files are only useful to the current session, so if the session is shut down and those temporary files remain, there could be trouble. This trouble occurs when one of these left-over files is corrupt — when you open Win-OS/2 a few weeks later and it recognises the left-over file as one that it can use, it'll load it in and voilà, instant GPF.

This was my friend's problem, one messed-up temporary file, and a never-ending cycle of GPFs. So, it's always a good idea to delete all temporary files using a different operating system (perhaps, say, OS/2?) before restarting another Win-OS/2 session. A good place to start is the temporary directory, as specified in your CONFIG.SYS file.

## File handles, you can't have enough

Ever had a message telling you 'Disk Full' or 'Disk Write Protected' when you know that there's no such problem? It's quite possible that your Win-OS/2 program doesn't have enough file handles

available.

Avid DOS users should remember editing their CONFIG.SYS file and seeing a line like:

FILES=20

This line indicates the maximum number of files that the DOS session may open. No problem if you're doing things like writing letters using Edit; but if you're running Windows on top of it, typing three documents using Word (and remember Word's extra temporary files), you quickly run out of handles.

Win-OS/2 runs from the same principle, so the logical thing to do is increase the number of file handles available to each session. If you use programs that use Object Linking and Embedding (OLE) or lots of inline graphics, the number of opened files can reach the limit of 20 very quickly, so increase it to the maximum, 255.

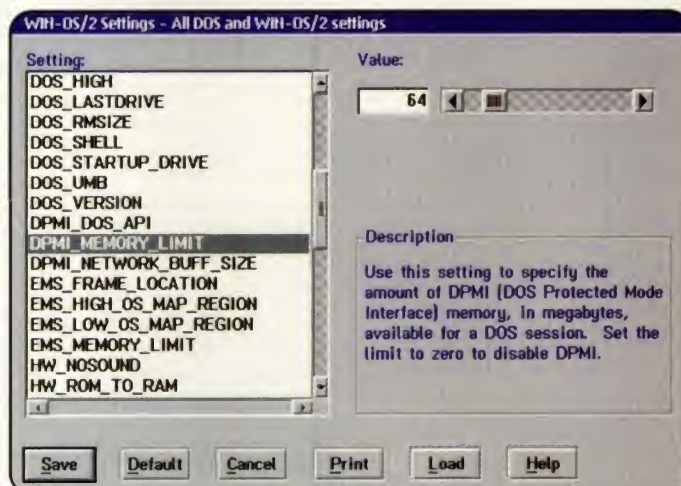
Just open the Settings notebook for the Win-OS/2 sessions, select the Settings tab, and then Win-OS/2 Settings. Choose Other DOS Settings and increase the DOS\_FILES setting to the maximum of 255.

## Watch what you're doing

Let's face it, not all operating systems are perfect. You really have to look out for them, because sometimes they can't

look out for themselves. If you are using hungry applications, you should monitor your system resources regularly.

Popular programs (again, like Word) have built-in system checkers where you can see your system's resources at a glance (in Word, it's under Help, About, System Info). If your Graphical Display Interface (GDI) falls below about 30%, it's time to think about saving your work and starting up a new session. Just closing and reopening Word in the



same session doesn't always help either — if the memory from the first instance isn't released properly, then you'll have even less to work with in the second.

## Final word

When all is said and done, these few simple tricks can make Win-OS/2 that little bit more reliable. But remember, there are native OS/2 programs for just about anything you need to do. So if a Windows program is failing you, look around for its OS/2 counterpart. ■



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*Want faster Java on the Mac? It's almost here, and there are some excellent tools to get you started. By Stephen Withers*

# Mac OS

**M**ac OS Runtime for Java (MRJ, <http://developer.apple.com/java/>) lets you run Java software on your Macintosh. It's not the only way; Netscape's browsers include a Java runtime environment, but Netscape is moving towards using external Java Virtual Machines (JVMs).

Prior to the release of MRJ 2.0 at the end of last year, Java implementation on the Mac had fallen well behind that of other platforms. MRJ 2.0 incorporates Java 1.1.3, and supports features including JavaBeans (the component technology for Java), RMI (Remote Method Invocation, a scheme for communication between objects which may be on different computers) and JDBC (Java Database Connectivity, an API providing access to SQL databases).

Progress has continued since then. At this year's Worldwide Developers Conference, Steve Jobs promised that MRJ 2.1 will be "as fast as the fastest Virtual Machine running on the fastest PC" when used on a 300MHz G3-based Mac. Apple's own CaffeineMark figures for Java on a G3/Mac OS 8.1 show it performing at one-quarter to one-third of a 400MHz Pentium II, depending on the JVM used on the PC. Even an early prerelease version of 8.5 had exceeded Navigator for Windows' Java performance. One reason for this spectacular improvement is that Apple has licensed Symantec's just-in-time (JIT) compiler.

It's not just a question of speed; the feature set is changing too. MRJ 2.1, which will be a part of Mac OS 8.5, will be based on JDK 1.1.6. Apple's development team is on a treadmill, as Sun's JDK 1.2 was already in beta at the time of writing. It will incorporate Swing, which will allow the creation of applications that take on the native look and feel of the operating system they are running on. This will remove the criticism that Java applications 'don't look right'. A Swing-compliant Java application will look like a native Mac application when it runs on a Mac, like a Windows application under Windows, and so on. Swing also defines a standard Java look and feel. An 'early access' version of MRJ 2.1 is available at <http://devworld.apple.com/java/text/prerelease.html>.

Apple and Microsoft have agreed to unify their Java implementations for the Macintosh. In particular, JDirect (the interface to native Macintosh system services) will be extended with the relevant features of Microsoft's JDirect; Microsoft security administration technology for Java will be integrated with other Internet security options to provide a simple and consistent model for managing security preferences; Microsoft's VM debugging API will be integrated into MRJ, including support for debugging across languages; and internal compatibility test suites will be exchanged for consistency.

The idea of a single JVM is catching on: Microsoft, Netscape, Symantec and Metrowerks will all be using Apple's JVM for their Mac products. QuickTime for Java has also been announced, allowing Java applications to play back movies. Don't forget that 'movie' is a generic term

Mac-style front end (accepting drag and dropped files and presenting a dialog box for filenames and options); the other integrates with Macintosh Programmers Workshop (MPW, Apple's traditional development environment).

MRJSDK also provides mechanisms for accessing Mac OS code. MRJToolkit provides access to many of the Mac OS Toolbox functions, and others — plus so-called 'legacy' code written in other languages (typically C or Pascal) — are accessible via the JDirect programming interface. Conversely, JManager allows C programs to access the JVM. All this, however, is beyond the scope of this article.

MRJ 2.0 requires a Macintosh or Macintosh-compatible system with a 68040 or PowerPC processor and System 8.0. MRJ 1.5.1 (which is JDK 1.0.2-compliant) remains available as it supports older hardware and software configurations not supported by MRJ 2.0, going back as far as 68030 processors and System 7.5.5.

So, back to the basic tools. Please remember that this is programming on the cheap: everything you need is free, but you miss out on the convenience of an integrated development environment.

You need a text editor to create your source file. For the smallest projects, the kind you typically find in how-to books and magazine articles, SimpleText will suffice. It requires little memory, so there's more chance

of being able to keep open all the applications you'll be using.

If you prefer, you can use a word processor such as ClarisWorks Office or Microsoft Word, but be sure to save your source code as a text file, not the default document format. Serious developers tend to choose a purpose-built editor, notably BBEdit (Lite and Demo versions are available at <http://web.barebones.com/free/free.html>, and are sometimes included on the CD-ROMs accompanying books on programming).

The idea of building the syntax-checking ability of a compiler into an editor is far from new, but surprisingly few



in QuickTime that includes video, animation, sounds and more. QuickTime for Java will also support Apple's 3D and virtual reality technologies. Apple is particularly touting QuickTime 3.0's ability to deliver high-quality video and audio at low bit rates, thanks to a variety of codecs.

Macintosh Runtime for Java Software Development Kit 2.0.1 (MRJSDK, downloadable from <http://devworld.apple.com/java/text/download.html>) lets you create your own software in Java. Two versions of the compiler and other tools from Sun's Java Development Kit (JDK) are included. One set has been given a





commercial products provide this feature. GenieWorks' SpotCheck 1.1 identifies syntax errors and semantic errors immediately after each edit. More information and a downloadable demo are available at <http://www.genieworks.com/>.

Metrowerks' CodeWarrior (<http://www.metrowerks.com/>) is probably the best known development system for the Macintosh, and is available with a Java compiler. A functioning but severely limited 'test drive' version is available at <http://www.metrowerks.com/lite/>.

If you want more of the work done for you, consider Simplicity for Java from Data Representations (<http://www.data-representations.com/>). This rapid application design tool for Java 1.1 is written completely in Java, and allows the interactive development of Java applications and applets. An interesting feature is the Code Sourcerer which writes code according to the user's responses to questions. A trial version is available from the Web site.

But that's getting away from our real theme of bare-bones Java programming. Once you've entered and saved the source code, close the document and go back to the Finder. Drag the source file onto the Javac (Java compiler) icon — you'll find it convenient to keep copies of the Java tools in the same folder as your source and support files — and click the Do Javac button in the resulting dialog box.

If you get a clean compile, all well and good, otherwise go back to the source code, make the necessary changes and recompile. If you left javac open, all you need to do is bring it to the foreground and click Do Javac again — the source, destination and switches will retain their settings.

The easiest way of running your

applet (assuming that's what you're creating rather than an application) is to change the creator code of the HTML file that references it. By default, it will be that of the editor which created the file, for example, ttxt for SimpleText. If you change it to WARZ, double-clicking the HTML file will open it in Apple Applet Runner, which will run your applet.

When working at this level, the only other tools you might need are Jar and JBindery. Jar packs multiple class and other files into a single Java archive. Drag all of the files you want to put in the archive onto the jar icon, and in the dialog box type the name of your new archive and click Do Jar.

JBindery converts Java applications into standalone applications. Drag your class file onto JBindery, then choose Save As from the File menu. Make sure the Save as Application box is checked, enter the name you've chosen for the runnable application, and click Save.

If necessary, you can specify what would be command line parameters within JBindery. Click the Command icon at the left of the window (this is the default panel), and type them into the Optional Parameters field. Click the Save Settings button to save the parameters with your runnable application, or the Run button to run it with the specified parameters. The latter choice closes JBindery, leaving your previously stored application parameters intact.

JBindery is more convenient than a browser or Apple Applet Runner for testing, as the parameters can be varied without having to edit and reload HTML source code. Unlike a browser, it runs in just 1M of RAM, so there's a good chance that you can keep it open alongside your other tools.

JBindery also provides the option of redirecting stdin and stdout (standard input and output) to the Java console window, files, or nowhere (a null device or bit bucket).

Various other settings can be specified, but once again they are beyond the scope of this article.

One last point: FileMaker Pro is a very popular database application, and its files are accessible to Java applications and applets via the Java classes provided with FileMaker Pro 4.0 Developer Edition ('100% Pure Java' certified). This should come as no great surprise, since FileMaker Pro 4.0 uses Java to provide the familiar look and feel to databases shared across the Internet or an intranet.■

## Python

You don't have to write a program in Java for it to be executable on the Java Virtual Machine. Just as you might have C and Pascal compilers producing 680x0 code, it's possible for a language other than Java to be compiled to byte-codes.

This hasn't yet been widely done, but one example is JPython (<http://www.python.org/jpython/>), a 100% Pure Java implementation of the Python language. Python (named after Monty Python's Flying Circus) is described as a high-level, dynamic, object-oriented language with a variety of features that make it an alternative to C, awk or Perl. As a programming language, Python has some interesting touches, such as using indentation to indicate grouped statements. After all, if you're going to indent the code so that a human can make sense of it more readily, why insist on using braces or begin/end pairs as well?

Because JPython is so closely coupled with Java, developers can readily use it to provide a scripting language within an application written in Java. Python provides an interpreter, which is also handy for prototyping.

Those planning to use JPython on a Mac may benefit from a utility called JPython Runner (<http://www.bekkoame.ne.jp/~mizutori/java/index.html#jpythonrunner>). This program, written by Mizutori Tetsuya, allows you to install JPython and the standard Python library, and run JPython scripts without using JBindery. Tetsuya's Web page also features other Java-related resources.

Unfortunately, I was only partially successful in getting JPython running. While I was able to run Python scripts via JPython Runner, I couldn't get the interpreter to run interactively via either JBindery or Python Runner. There was insufficient time available to determine whether this was due to a configuration error on my part, or some other problem. However, Python does look like a language worth exploring further.



*How to run an email server under Linux.*

**By Geoffrey Bennett**

# Linux

**I**n this article I will describe how to set up Linux to send and receive email for an entire domain, where your computer has either a permanent Internet connection with a static IP address, or a part-time Internet connection with a dynamically assigned IP address.

There are three common ways for a Linux server to receive email: SMTP, POP-3/IMAP, and UUCP. The most common of these is SMTP (Simple Mail Transport Protocol); nearly all email on the Internet is transferred via this protocol. SMTP works well if you have your own domain name, and your mail server is always (or nearly always) connected to the Internet and has a static IP address.

If you only have a part-time connection to the Internet, or if you don't have your own domain name, you can use a program called 'fetchmail' to collect your email from the POP3 (Post Office Protocol 3) or IMAP (Internet Message Access Protocol) server at your ISP. UUCP (Unix-to-Unix Copy Protocol) is one of the best ways of transferring email for a whole domain if you are not connected full-time to the Internet. Unfortunately, few ISPs support it these days, so I won't describe its use further.

Although there are a number of different SMTP mail servers (or 'Mail Transport Agents') available, I will only describe the use of 'sendmail', as it is the de facto standard for mail transport on the Internet.

## Configuring sendmail

The default sendmail configuration will work fine if you have a static IP address, a permanent connection to the Internet, and your own domain name. You will need to arrange for the primary MX record for your domain name to be set to the full hostname of your email server (your ISP will be able to help you with this). It is also a good idea to arrange with your ISP for one of their hosts to act as a secondary MX server. An MX server is a 'mail exchanger' — a server that is willing to accept mail for a particular domain.

If the hostname of your mail server is not the same as your domain name (for example, if you have the domain name

'company.com.au', and your mail server is called 'blue.company.com.au'), then you will need to tell sendmail that it should accept and deliver email addressed to 'someone@company.com.au' as well as 'someone@blue.company.com.au' (which it will do by default). To do this, add your domain name to the /etc/sendmail.cw file.

## Adding users to your mail server

Once you have sendmail delivering email for 'company.com.au', you will want to add a number of users to your system, which can be done with the useradd command. If you want to disallow shell logins (which is generally a good idea for email-only users), set their shell to /bin/false. For example, to add a user called 'someone', you could type:

```
useradd -s /bin/false someone
```

To set a password for 'someone', type

```
passwd someone
```

## Allowing users to read email

Once a user is set up, they can retrieve their email from your mail server using either POP3 or IMAP. The 'imap' package included with Red Hat Linux supports both POP3 and IMAP. For the example username and server above, their settings should be as follows:

```
Email Address: someone@company.com.au
Mail server user name: someone
Outgoing mail (SMTP) server: blue.com-
pany.com.au
Incoming mail server: blue.company.com.au
```

For the outgoing mail to work, you may need to configure your email server to permit relaying. See 'Antispam configuration' on next page.

## Part-time connections

If your host is not connected full-time to the Internet, there is the obvious problem

of email not being able to be sent to you directly when you are not online. If you have a static IP address, you can still use the same configuration as above, but this time you are relying on your secondary MX host whenever you are not online.

The problem with relying on your ISP forwarding mail to you with SMTP is that if your mail is left for too long at your ISP, warning messages will be sent back to the senders telling them that their email has not yet come through. The default warning timeout for sendmail is set to four hours, which means you must poll for your mail at least that often. While this may be acceptable if you have a permanent connection, it could be very annoying to people if they receive warning messages every time they send an email to your domain.

When your secondary MX host is holding mail for you, it will attempt to deliver it every so often, at intervals determined by the administrator. Since you can't control when the remote site attempts its regular delivery, it is handy to be able to tell it 'I'm online; please deliver the mail now'. This can be done by running fetchmail -p etrn mailserver.yourisp.com.au.

In the same way that your secondary cache will store email for you and wait until you are connected, your local email server will do the same if you are not online and someone sends a message. Running sendmail -q requests your sendmail to process its queue of outgoing messages. Rather than running both of the above commands every time you connect to your ISP, you can place these commands in /etc/ppp/ip-up, which is a script that gets run every time a PPP connection is started.

## fetchmail

If you cannot poll for mail more often than your ISP's SMTP warning timeout, you may want to consider getting your ISP to deliver all incoming messages for your domain into one mailbox on its server. You can then use fetchmail to retrieve the email and distribute it to your local mailboxes. To configure fetchmail to retrieve email from your ISP and distribute it to your local users, create a file in /root called



.fetchmailrc, and place in it the following lines:

```
poll mailserver.yourisp.com.au
protocol imap
localdomains company.com.au
user remoteuser with password yourpassword
to * here
```

The table below explains the configuration options in the above file.

### Configuration options

**mailserver.yourisp.com.au** The name of the POP3 or IMAP server at your ISP.

**imap** Either 'pop3' or 'imap' as appropriate (IMAP is preferred, but not all ISPs have IMAP servers).

**company.com.au** Your domain name.

**remoteuser** The POP3 or IMAP username to which email for everyone@company.com.au is forwarded.

**yourpassword** The POP3 or IMAP password for remoteuser.

After creating the file, type `chmod 600 /root/.fetchmailrc` to ensure that nobody apart from root can read it. The next step is to add your domain name to `/etc/sendmail.cw` (as for a permanently connected setup above). When fetchmail retrieves the email from your ISP's server, it will redeliver it to your local sendmail. If the sendmail running on your computer is not expecting to receive email for your domain because the domain is not listed in `/etc/sendmail.cw`, it will forward it back to your ISP for delivery. Fetchmail will then retrieve the same mail next time, and sendmail will forward it back again and again until one of the systems notices an email loop. You should also make sure that your hostname and its associated IP address appears in `/etc/hosts`. Fetchmail will not work if it can't figure out your computer's IP address (if you have no other IP address, you can use the 127.0.0.1 loopback address).

After performing the above configuration steps, create a user (the procedure is the same as before), and send a test message to that user at your domain. Run fetchmail and it should display something like:

```
# fetchmail
1 message for remoteuser at
mailserver.yourisp.com.au (373 bytes).
```

reading message 1 of 1 (366 header bytes) (7 body bytes) flushed

If your test is successful, you can now set up fetchmail to run automatically. If you use the `-d n` switch to fetchmail, it will put itself into the background and check for mail every 'n' seconds. For example, `fetchmail -d 900` will check for mail every 15 minutes. Adding this command to your `/etc/rc.d/rc.local` file would be appropriate if you wanted fetchmail to start up when you boot Linux. If you wanted fetchmail to run at different times (such as every 15 minutes, but only between 9am and 5pm Monday to Friday), you could use cron instead to make it run exactly when you want it to.

If an email is sent to a user that doesn't exist on your server or fetchmail cannot figure out where the mail should be delivered, it will be forwarded to root. If you want this email to go elsewhere, create an alias for root by adding a line such as this to `/etc/aliases`:

```
root: bob
```

Note that any time you edit the `/etc/aliases` files, you must run the `newaliases` command for your changes to take effect. Also, the aliases facility can be used to create other email addresses such as 'sales' or 'support'. For example, to forward email for 'sales' to 'bill', and email for 'john.smith' to 'john', you could add these two lines:

```
sales: bill
john.smith: john
```

It is easy to set up fetchmail to sort email out from one mailbox at your ISP into many local mailboxes, but there is one potential problem that is worth considering: when your ISP places messages, sent to anyone at your domain into one mailbox, information on who the message should be delivered to may be lost. For most messages, there is no problem, because the 'To:' header in the email says who the message is for. For some messages, though, particularly messages received through mailing lists, the 'To:' header will be the mailing list address, not the final recipient in your domain. If the information as to the final recipient has already been discarded by the time fetchmail receives the message, fetchmail will not be able to figure out for whom it is intended, and the message will be forwarded to root as described above. It is worth checking with your ISP to find out whether this will be a problem.

## Connecting to your ISP automatically

To have Linux connect to your ISP automatically when needed, take a look at 'Diald', the demand dialing daemon for Linux. Diald can be configured to bring up a PPP connection as necessary and/or at particular times of the day.

For example, you could set it to keep a PPP connection running between 9am and 5pm Monday to Friday, and keep PPP running only as needed outside those hours. Diald is also capable of being configured so that it won't continually try to start a PPP connection and thereby run up a huge phone bill if something goes wrong at your ISP which prevents you from connecting.

## Antispam configuration

With any mail server that is connected to the Internet, it is worth your time to set it up so that it cannot be used as a relay host for unauthorised clients. For example, it is common practice for a spammer to use some unsuspecting person's mail server to send their mail for them. To prevent this practice, sendmail can be configured to only take delivery of email if it is from an authorised client, or if it is to an address that it can directly deliver to.

The sendmail configuration included with Red Hat Linux 5.x uses the antispam configuration 'rulesets' available at <http://www.informatik.uni-kiel.de/~ca/email/check.html>. The `/etc/mail/ip_allow` and/or `/etc/mail/name_allow` files are used to list your local clients.

Place the IP addresses (for example, '127.0.0.1' or '10.1.2.7') or network numbers (for example, '10.1.2' or '10.1') of your clients in `ip_allow`.

Alternatively, you can place hostnames or domain names in `name_allow`.

For more information, check out these resources:

### sendmail

<http://www.sendmail.org/>  
*sendmail* (second edition), by Bryan Costales and Eric Allman, published by O'Reilly & Associates, distributed by Woodslane, phone (02) 9970 5111, ISBN 1-56592-222-0.

### fetchmail

<http://sagan.earthspace.net/~esr/fetchmail/>  
 Or look in `/usr/doc/fetchmail-*/` on your system.

### Diald

<http://www.loonie.net/~eschenk/diald.html>



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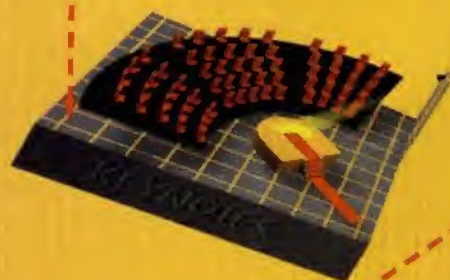
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This month we return to the topic of pointers.

By Michael Smith

## Developers Corner

### The sum of us

Pointer Arithmetic. It's one of those features which separates C and C++ from the other languages. It makes some complex tasks simple. It gives you power. It gives you flexibility. It gives you ample rope with which to hang yourself.

Working with pointers gives you a chance to get *close to the metal*, but watch out: the metal sometimes gets hot.

### Strings 'n' things

Let's start with some string examples. You will hopefully remember from last month that a string is an array of characters that is terminated by a nul or zero character. We'll start by implementing our own version of the standard library function `strlen()`, which returns the length of a nul-terminated string.

```
int strlen( char *pszString )
{
    int iLength;
    iLength=0;
    while (pszString[iLength]!='\0')
        iLength++;
    return iLength;
}
```

This implementation is a simple, array-based solution. We increment the array index until we find the nul character, indicating the end of the string. A call such as `strlen( "ABC" )` will return three; the nul character is not included as part of the length. Alternatively, we could have implemented `strlen()` using a pointer-based solution.

```
int strlen( char *pszString )
{
    int iLength;
    for (iLength=0; *pszString!=0; pszString++)
        iLength++;
    return iLength;
}
```

Instead of using `iLength` as an index, we continually increment the pointer.

### Pointer arithmetic

Pointer arithmetic is slightly different from arithmetic involving other data types. Consider a simple example:

```
int a[3] = { 1, 2, 3 };
int *pa = a;
pa++;
```

The clause `pa++` increments `pa` by one, but what does that really mean? It means to increment the pointer to the address of the next array element. This will often mean changing the numeric value of the pointer by more than one.

Using pointer arithmetic, we get yet another possible implementation of `strlen()`.

```
int strlen( char *pszString )
{
    char *pszEnd = pszString;
    while (*pszEnd != '\0')
        *pszEnd++;
    return pszEnd-pszString;
}
```

We increment the second pointer until we find the end of the string. The length is then the difference between the two pointers.

### Example: Memory allocation debugging kit

One of the more common programming errors is to overrun the end of a buffer. One way to test for that is to write wrapper functions for `malloc()` and `free()`. These wrapper functions can allocate extra memory at the beginning and end of the buffer and check that nothing is written into these areas. When the software is ready for production, simply replace the wrapper functions using macros to avoid any performance penalty. A full system would also need replacements for `calloc()` and `realloc()`, but for simplicity I've left them out here.

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
```

```
/* DEFINE HEAD AND TAIL STRUCTURES */
typedef unsigned char pattern_t[32];
typedef struct head_t {
    size_t size;
    pattern_t pattern;
} head_t;
typedef struct tail_t {
    pattern_t pattern;
} tail_t;
```

```
/* DEFINE A STANDARD PATTERN TO BE */
/* PLACED INTO THE HEAD AND TAIL */
#define CP (unsigned char)255
pattern_t stdpattern = { CP, CP, CP, CP, CP, CP, CP, CP, CP, CP, CP, CP, CP, CP, CP, CP, CP, CP, CP, CP, CP, CP, CP, CP, CP, CP, CP, CP, CP, CP, CP, CP };
/* MACRO TO COMPUTE THE TOTAL SIZE TO ALLOCATE */
#define ALLOC_SIZE( size ) ( (size) + sizeof(head_t) + sizeof(tail_t) )
/* MALLOC REPLACEMENT */
void *memalloc( size_t size )
{
    char *p = malloc( ALLOC_SIZE(size) );
    head_t *pHead;
    tail_t *pTail;
```

```
/* MACRO TO COMPUTE THE TOTAL SIZE TO ALLOCATE */
#define ALLOC_SIZE( size ) ( (size) + sizeof(head_t) + sizeof(tail_t) )
/* MALLOC REPLACEMENT */
void *memalloc( size_t size )
{
    char *p = malloc( ALLOC_SIZE(size) );
    head_t *pHead;
    tail_t *pTail;
```

```
/* MALLOC REPLACEMENT */
void *memalloc( size_t size )
{
    char *p = malloc( ALLOC_SIZE(size) );
    head_t *pHead;
    tail_t *pTail;
```

```
if (!p) return NULL;
```

```
/* COMPUTE OFFSETS FOR HEAD AND TAIL */
pHead = (head_t *)p;
pTail = (tail_t *) (p+sizeof(head_t)+size);
```

```
/* SAVE BUFFER SIZE */
pHead->size = size;
/* SAVE A KNOWN PATTERN INTO HEAD AND TAIL */
/* SO YOU CAN TELL IF THEY ARE OVERWRITTEN */
memcpy( pHead->pattern, stdpattern, sizeof(pattern_t) );
memcpy( pTail->pattern, stdpattern, sizeof(pattern_t) );
```

```
/* RETURN POINTER TO THE DATA BUFFER */
return p;
```



```

/* PAST THE HEAD */
return p+sizeof(head_t);
}
/* TEST A BUFFER TO SEE IF OVERWRITE
HAS OCCURRED */
int memvalid( void *pv )
{
    head_t *pHead;
    tail_t *pTail;
    char *p = pv;

    if (!p) {
        printf( "Tried to validate NULL pointer\n" );
        return 0;
    }

    pHead = (head_t *) (p-sizeof(head_t));
    if (memcmp( pHead->pattern, stdpattern,
sizeof(pattern_t) )) {
        printf( "Head has been corrupted\n" );
        return 0;
    }

    pTail = (tail_t *) (p+pHead->size);
    if (memcmp( pTail->pattern, stdpattern,
sizeof(pattern_t) )) {
        printf( "Tail has been corrupted\n" );
        return 0;
    }
    return 1;
}

```

```

/* FREE REPLACEMENT */
void memfree( char *pv )
{
    char *p = (char *)pv;
    head_t *pHead;

    if (!memvalid(p)) return;

    /* MAKE SURE THE WHOLE ALLOCATED
AREA IS FREED */
    pHead = (head_t *) (p-sizeof(head_t));

    free( pHead );
}

```

All you need now is a header to include in every module.

```

#if DEBUGGING
#define malloc( s ) memalloc( s )
#define free( p ) memfree( p )
#else
#define memvalid( p )
#endif

```

## A rather clever example

I can be lavish with praise for this example, because I didn't write it. The following code for function `xstrcmp()` was pinched

## Passing pointers as arguments

In most programming languages there are two ways to pass arguments to a function: *by value* and *by reference*. Actually, there are a few other ways, but to the programmer they are indistinguishable from those two.

For example:

```

#include <stdio.h>
#include <stdlib.h>
void valfunc( int i )
{
    i = 3;
}
void reffunc( int *j )
{
    *j = 4;
}
void arrfunc( int *iarr, int num )
{
    while (num--)
        *(iarr++) = 0;
}
int main( void )
{
    int i=1, j=1;
    int *iarr = malloc( 2*sizeof(int) );

```

```

    iarr[0] = iarr[1] = 9;
    valfunc( i );
    reffunc( &j );
    arrfunc( iarr, 2 );
    printf( "%d %d (%d %d)\n",
        i, j, iarr[0], iarr[1] );
    free( iarr );
    return 0;
}

```

The function `valfunc()` gets a copy of `i` from `main()`. Any changes made to that copy have no effect on the variable `i` in the `main()` function. The function `reffunc()` gets the address of `j`. Changes to `*j` will change the value of `j` in the `main()` function.

That's pretty straightforward so far, but here's the tricky bit. The function `arrfunc()` gets passed a copy of `iarr`. Changing the pointer `iarr` has no effect on `iarr` in the `main()` function. However, `iarr` is a pointer. The memory to which `iarr` points in `arrfunc()` is the same memory to which it points in `main()`. So while `iarr++` in `arrfunc()` has no effect on `main()`, `*(iarr++)=0` certainly does. Thus, the output from this program is: 1 4 (0 0).

from Bob Stout's Snippets. Snippets is a repository of source code and ideas which is invaluable for the C/C++ programmer. You can find it at <http://www.snippets.org/>.

The function `xstrcmp()` is an extended version of the standard library function `strcmp()` which accepts the wildcards `?` and `*`. There is a simple wrapper function to take care of validation, then an elegant recursive function: `MatchPattern()` which does all of the work. The recursive implementation means that it's not optimised for speed or memory usage, but the sheer simplicity of this solution to a fairly complex problem makes it an excellent implementation.

```

#include <stdlib.h>
#include <assert.h>

static int MatchPattern( const char *pszStr,
const char *pszPat )
{
    switch (*pszPat) {
        /* REACHED END OF PATTERN. MATCH
        IFF STRING IS ALSO FINISHED */
        case '\0':
            return !*pszStr;

```

```

        /* * CHARACTER MEANS MATCH ANY-
        THING OR NOTHING */
        case '*':
            return MatchPattern( pszStr, pszPat+1 )
            || *pszStr && MatchPattern( pszStr+1, pszPat
            );
        /* ? CHARACTER MEANS MATCH ANY
        SINGLE CHARACTER */
        case '?':
            return *pszStr &&
                MatchPattern( pszStr+1, pszPat+1 );
        /* NORMAL CHARACTER: TEST FOR
        MATCH */
        default :
            return (*pszPat == *pszStr) &&
                MatchPattern( pszStr+1, pszPat+1 );
    }
}

```

```

int xstrcmp( const char *pszStr, const char
*pszPat )
{
    assert( pszStr && pszPat );
    return MatchPattern( pszStr, pszPat );
}

```

Well, if you didn't start out as an expert on pointers you probably still aren't one. That takes a few years of blood, sweat and tears. Hopefully, though, you're now a few steps closer. ■



This month we wrap up the JavaScript series.

By Travis Simon

# JavaScript

**T**his article, the 16th in the series, will bring JavaScript to an end. Yes, sadly, this is the last one. The good news, however, is that this month's CD contains all of the articles and examples from preceding months combined into one huge mega-example. The guide also features an interactive language reference that proved invaluable during the writing of the columns. It is truly unique, and should be of great use to you during your future JavaScript development.

If you're just now joining us, you're in luck. Like I said before, this month's example contains more information in it than you could possibly want. And, if you've been with me all along, the language reference should prove to be of great value to you in the future.

## The JavaScript tutorial

Since I've only written about 150 words and I don't really have anything left to say about JavaScript, I'm going to spend the rest of this article looking at the programming behind the tutorial. If you haven't already looked at the tutorial, now would probably be a good time, as most of what's going to be said will make a lot more sense if you do.

## The goals of the tutorial

To put the tutorial in perspective, here are some of my goals in creating it. My first concern was completeness. I wanted the tutorial to contain everything you could possibly want to know about JavaScript, with as little extraneous noise as possible. To a great extent, judging by some of the feedback I've received, I think I have achieved that. However, if you've ever had any problems or felt uncertain with any of the concepts presented, let me know and I'll update the tutorial for a later revision.

My next goal was to try to cater for people who already know how to program, and

don't need to have the concept of a loop explained to them. This is the impetus for the 'review mode' in the navigator feature. It's not perfect, but it's better than nothing.

Another conscious decision I made was to use the tutorial to demonstrate the concepts presented within the tutorial itself. The idea is that the tutorial illustrates a useful implementation of a concept as it's being presented. This too was successful, although some of the concepts will only really apply if you're creating a JavaScript tutorial!

Finally, my last goal — and perhaps the most important — was to provide a resource that would be useful after the user has been through the tutorials. What was needed was some logical way to browse through JavaScript's standard objects. To this end, I created the language reference, which I truly believe is unique to this tuto-

few concessions for users in low bandwidth situations.

The majority of the JavaScript code for the tutorial is contained within separate modules located in the 'modules' directory. It is here that we will begin our look at the tutorial.

## Browser redirection

The first thing the script does is redirect the user to a different page based upon the browser being used. Internet Explorer 3 browsers will be directed to data/jsver10.htm, while people using anything else will be directed to data/jsver11.htm. If you're using IE3, you should probably consider upgrading to a better browser (my opinion).

## The navigator module

The relative URLs to the articles are all stored in an array called 'articles' (imaginative, I know). The 'currentPage' variable is used to track the current page being viewed. Finally, the move function simply increments or decrements the currentPage variable and loads the URL in the articles array indexed by the new currentPage value.

The only stipulation is that, if the 'view by review' variable is true, the move function needs to jump to the next (or previous) review or example page. To accomplish this, a long if...else if...else conditional checks the current value of the currentPage variable against successively

larger or smaller values (depending upon whether the argument to move is positive or negative), redirecting the page appropriately. This is fairly crude, but effective, and a no-brainer to implement.

Once the new page is loaded, a cookie containing the new current page is set. Cookies are used in the tutorial to track which page was last viewed so that when a user restarts the session, the tutorial will pick up where the user left off.

## The cookie module

The cookie module provides the get-



rial. In short, this is my attempt to create the tutorial that I always wanted for myself. I still use it regularly, and I hope that it will be as useful to you as it has been to me.

Also, it should be noted that I intended for this tutorial to be placed on one of our cover CDs from the beginning, and many of the design decisions (such as placing all the language reference data in the default page) were influenced by this. However, taking into consideration that there might be people that don't subscribe to APC that might find the tutorial useful, I made a



Cookie() and setCookie() functions, which have been discussed previously.

## The langRef module

The langRef module contains too many minor details to cover fully within this limited space. However, the module, along with the others, will be explained in the tutorial. Instead, we'll take a look at how the module operates here.

Note: The language reference module is slightly difficult to explain, due to the fact that it contains a description of the JavaScript language, written in JavaScript itself. The description of the language is contained within a number of objects that include attributes such as the name of the object and its description. These objects describing the language will be called js(Object)s. For example, the object describing JavaScript's standard properties will be called a jsProperty object (to reflect the naming convention used in the code).

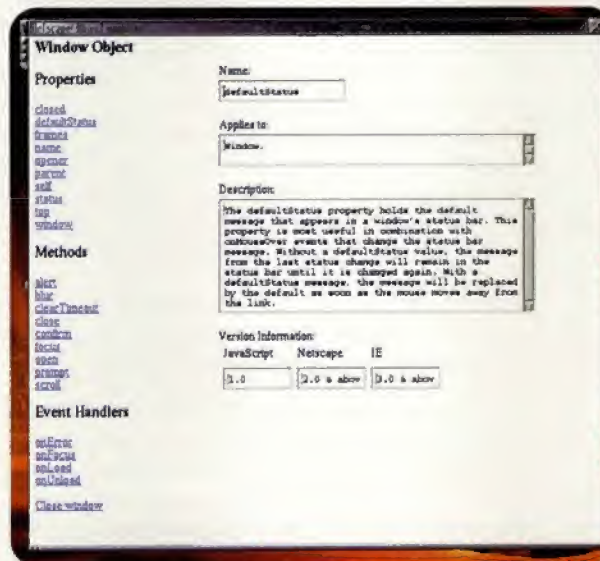
At the heart of the langRef module are four objects that contain the information for the entire language reference. These objects are the jsProperty object, the jsMethod object, the jsEventHandler object and the jsObject object. The property, method and event handler objects are almost identical, so we'll only look at one for now. The constructor for the jsProperty object looks like this:

```
function jsProperty(theName, appliesTo,
description, width, height, version) {
    this.name = theName;
    this.appliesTo = appliesTo;
    this.description = description;
    this.width = width;
    this.height = height;
    this.version = version;
    this.objectType = "Property";
    this.getName = getName;
    this.getDescription = getDescription;
    this.getWidth = getWidth;
    this.getHeight = getHeight;
    this.getAppliesTo = getAppliesTo;
    this.getVersion = getVersion;
    this.getType = getType;
}
```

Notice that all of the properties preceded with 'get . . .' (for example, getName) accessor methods. These methods simply return the value in the associated property. For example, the

getName() method returns the property's name. Although technically useless, it provides a more elegant approach, and simulates the behaviour of a true object-oriented language.

Most of the properties of the jsProperty object are fairly self-explanatory. The width and height properties are used for the pixel values when a new window displaying the property is



opened. The objectType property is always set to 'Property' (the value will be different for other objects in the language reference). This value is used in the language reference with generic functions that act upon all of the objects, but need to behave differently for each object.

There is also a 'jsObject' object, which defines an object's name, and contains arrays of all the object's properties, methods and event handlers. The only tricky thing to pay attention to is situations where an object doesn't contain any properties, for example. In this case, the object is assigned the noProperties array, which only contains one element (a blank placeholder). The noProperties element has to be an array, however, or the code will spit the dummy later when it is expecting to act on an array.

## Program execution

When the language reference button is pressed, a new window is opened containing the data/search/oindex.htm (object index) document. This document contains the HTML formatting for the

'View By' choices and the listing of all the JavaScript objects. For now, we'll assume that the user has pressed the 'View By Properties' radio button, which opens the PINDEX.HTM (property index) document.

The list of available properties is taken directly from the language reference objects, so that when a user selects an object and presses the 'Show Property' button, the code can call the show() property with that text argument. The show() property will then search for that property, and display the object.

The show() method's first job is to open a new window for display, using the height and width values of the property. Next, it calls a function to create an HTML formatted string displaying the name and description of the document (this part of the code was pretty fun to write, by the way).

The cool thing about the show() method is that it creates links to a function that displays the parent objects. This is the same function that is called when a user chooses an object from the language reference window.

## Displaying objects

When the user wishes to display an object, a number of steps happen simultaneously. First, a frameset is created in a new window. In the left-hand side is a blank document, and in the right-hand side is an HTML form containing text boxes for displaying information. The right-hand document also contains an onLoad event handler that calls a function to fill the left-hand document with links. These links are generated from the object's properties, methods and event handlers. When one of the links is pressed, it calls a function to display information for that property, method, or event handler in the text boxes on the right-hand document. Got it? This will all be covered in more detail at the end of the tutorial.

## Final words

Writing the JavaScript column has been quite educational for me, and I hope it has provided a good service to you. It's been a long haul, but we made it! Please, let me know what you think by emailing me on trav@acp.com.au. Until next time, enjoy your scripting!■



*Solving the problem of misalignment using marginal attributes.*

**By Lee Borkman**

# HyperText

**L**ast month we were looking at some tools that can help with the basic task of Web-page layout. NetObjects Fusion and Microsoft FrontPage do a pretty good job of placing your text and images in the right spot, but unfortunately, they cannot yet do it perfectly. Here, for example, is one common task that WYSIWYG page editors have yet to conquer.

Imagine that we want a simple page with a standard background. You know, a strip of colour down the left-hand side of the page, and a great slab of white (or near-white) on which the main content will be displayed. The normal technique uses the BACKGROUND attribute of the BODY tag:

```
<BODY BACKGROUND="colourstrip.gif">
```

The specified image will tile horizontally and vertically to fill the background of your page. There are a few tricks to making a decent tiling image, but here are two points you might not have considered:

- Don't make the image too small. What's that? Isn't the whole idea to make the image as small as possible so you don't chew up the bandwidth? Yes, that's right, up to a point. An image that's 100 pixels high is likely to be too big, but a background GIF that's only a single pixel high makes the poor browser do a lot of work — it has to repeat that image several hundred times to fill the window. The result is actually a noticeable decrease in performance. I'm not necessarily a fan of all of David Siegel's Web designs, but his book, *Creating Killer Web Sites*, has become a deserving classic. David suggests that a background image should be around 20 pixels high for the best possible performance.

- One of my pet Web-hates is the background image that is not wide enough. I do most of my surfing at 1,024 by 768 resolution, with the browser window open to about 900 pixels. Several times every day, I see a standard colour-strip background that begins to repeat itself over to the right of the window. Tacky. To cater for all shapes and sizes of browser and surfer, I'd

recommend a background image that's 1,200 pixels wide. If the image is made of solid colours, then the resulting GIF file will not be significantly larger.

Now suppose that we have an image that we want to display on our page, and we want to align the image precisely against the background. There are many situations where you need to position the foreground exactly. David Siegel describes the use of sophisticated image editors like Photoshop to perform anti-aliasing on layered images. This is great for smoothing out pixelated edges, but anti-aliasing works by creating a subtle graduation of colour between the image and its background. That means that the anti-aliasing is specifically created for a particular background. If your image has been anti-aliased against a blue background, you cannot just place it on top of a red background. In the case where you want an image that lies across the border between the background colours, you need to do two things:

- Anti-alias the image against a background like your intended background GIF; and
- Position your anti-aliased image relative to the background.

This is where we encounter trouble. Let's take a simpler example. Make the coloured strip on our background 100 pixels wide. Let's say that we want to align the left of a rectangular foreground image with the edge of our background strip. The obvious solution is to use a TABLE to position the image:

```
<HTML>
<HEAD><TITLE>Image alignment test
</TITLE></HEAD>
<BODY BACKGROUND="colourstrip.gif">
<TABLE CELLSPACING="0" CELL
  PADDING="0" BORDER="0">
<TR>
<TD WIDTH="100"></TD>
<TD><IMG SRC="square.gif"></TD>
</TR>
</TABLE>
</BODY>
</HTML>
```

If you take a look at the results in several

browsers, you will see that the foreground does not line up with the background (image alignment test 1). Even worse, if you compare Communicator with IE4 you will see that the red square is positioned slightly differently in each browser. This is known as the 'browser offset problem'. By default, browsers impose an offset or margin on the page content. It seems to be a little over 10 pixels, but it varies from browser to browser. You could try varying the width of the empty TABLE column until the image lines up properly, but you'll still find that the major browsers are inconsistent. There has to be a better way.

Well, the sad fact is that Netscape and Microsoft have come up with their own separate solutions to the problem. IE4 accepts four new attributes for the BODY tag: LEFTMARGIN, RIGHTMARGIN, TOPMARGIN and BOTTOMMARGIN. In practice, you will usually stick with LEFTMARGIN and TOPMARGIN. These attributes take a numerical value that specifies the margin width in pixels. We can now modify the BODY tag in our test page:

```
<BODY BACKGROUND="colourstrip.gif"
  LEFTMARGIN=0 TOPMARGIN=0>
```

If you try this out you will find that IE4 displays the image aligned perfectly with the background, but Communicator looks no better than before. Why is that? Well, it should come as no surprise that Netscape has its own set of BODY tag attributes: MARGINHEIGHT and MARGINWIDTH. They work exactly as you might expect. The good news is that they can be included in the BODY tag along with the Microsoft-specific attributes:

```
<BODY BACKGROUND="colourstrip.gif"
  LEFTMARGIN="0" TOPMARGIN="0"
  MARGINWIDTH="0" MARGIN-
  HEIGHT="0">
```

This will now work beautifully in both Version 4 browsers. We should have no trouble making our foreground and background mesh together precisely. There is just one teensy problem: Netscape 3. Netscape Navigator doesn't recognise any of the new BODY attributes.



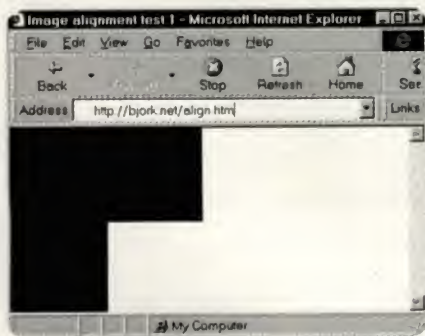
There is, however, one clumsy age-old workaround that will do the trick for Netscape 3 as well. HTML frames have been around for quite a while now, and you might be surprised to learn that frames have included control over margins for much longer than the simple BODY tag. Let's put our sample page inside a FRAMESET:

```
<HTML>
<HEAD>
  <TITLE>Frame margins</TITLE>
</HEAD>
<FRAMESET ROWS="50%,*">
  <FRAME SRC="align.htm">
  <FRAME SRC="align.htm">
</FRAMESET>
</HTML>
```

Test that out in Navigator, Communicator and IE4. You will see that IE4 sets the margins to zero by default, but the Netscape browsers both have positive offsets. Now add two more attributes to the FRAME tag:

```
<FRAME SRC="align.htm" MARGIN-
WIDTH="0" MARGINHEIGHT="0">
```

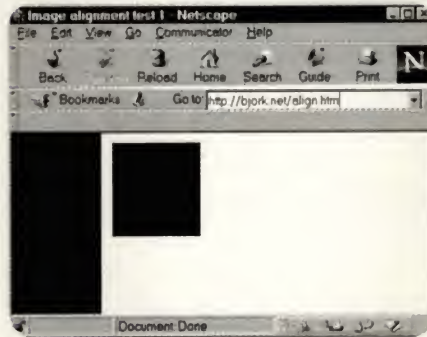
You should now see that the margins disappear in Communicator. In Navigator, you'll find that the offset is reduced to a sin-



gle pixel. This, as far as I know, is the best you can do. Anyway, how does this help us get rid of the margins in our simple test page? The trick is to display the page within a FRAMESET. Now FRAMESETs need to include at least two FRAMES, but you can put in a dummy FRAME with no source:

```
<HTML>
<HEAD>
  <TITLE>Frame margins</TITLE>
</HEAD>
<FRAMESET ROWS="100%,*" FRAME-
BORDER="0" FRAMESPACING="0" BOR-
DER="0">
  <FRAME SRC="align.htm" MAR-
```

```
GINWIDTH="0" MARGINHEIGHT="0">
  <FRAME>
</FRAMESET>
</HTML>
```



Note that the FRAMESET has two rows defined, but the first is allocated 100% of the available window. I have also turned off the frame borders and interframe spacing. Designing frames is similar to using tables — start with borders on so you can see what's happening, then turn them off for the final version. You should also add a NOFRAMES tag for compatibility with older browsers. One clever idea is to put a 'client-pull' (see APC December, page 166) inside the NOFRAMES, so an old browser gets redirected to your original page (in this case, ALIGN.HTM). I'd be a little cautious about that technique, though. If a browser doesn't understand frames, it might well have trouble with tricky META tags.

This kind of technique is too much trouble to use throughout your site. Creating a separate content file and frameset definition file for each page is a major pain. There are two sensible compromises:

- Use the frameset for your home or 'splash' page. Do not include TARGET attributes in your links. All pages that follow will be displayed within your margin-killing frame. This has implications for refreshing, viewing source, and bookmarking;
- Once again, use the frameset for your home page. This time, however, include TARGET="\_parent" in your links. The new pages will pop up and replace the entire frameset. This is my preferred solution.

OK, so there we have an ugly workaround for (almost) eliminating margin offsets. And why were we doing this? So we could line up our foreground with our background. Well, now I'm going to suggest another way of aligning solid-colour backgrounds with foreground images. Last month, we were discussing 'image-

slicing', where a single picture is cut up into rectangular pieces, then reassembled using borderless tables.

Now consider our red rectangle and background stripe. We can replace the background GIF with a two-column table. Use the BGCOLOR attribute of the TD tag to create the stripe:

```
<HTML>
<HEAD><TITLE>Image alignment test
2</TITLE></HEAD>
<BODY LEFTMARGIN=0 TOPMARGIN=0
MARGINWIDTH=0 MARGINHEIGHT=0>
<TABLE WIDTH="100%" BORDER="0"
CELLSPACING="0" CELLPADDING="0">
<TR>
<TD WIDTH="15%" HEIGHT="1200"
BGCOLOR="#000000">&nbsp;</TD>
<TD WIDTH="85%" VALIGN="TOP"><IMG
SRC="square.gif"></TD>
</TR>
</TABLE>
</BODY>
</HTML>
```

In this example, I have used percentages to define the WIDTHs of the columns. This means that the column, the coloured stripe, and the foreground image will all move together, in perfect alignment, as the window is resized. Getting rid of the background GIF results in a faster download, and also increases browser performance, by eliminating the overhead for tiling. You can use the techniques of image-slicing to place a more complex image over your background. It takes some thoughtful use of ALIGN and VALIGN to get the images to join up when the page is resized. A tool like Macromedia Fireworks will chop up the image, and create most of the HTML for you. If the image is too complex, you will have to use absolute pixel widths for your table columns.

Note that this arrangement will allow you to align your images, even in Navigator 3 with its annoying margin offsets. For complete obsessives, it is of course possible to combine the margin-killing FRAMESET workaround with the image-slicing and TABLE.

The ability to scale your pages and their backgrounds as the window is resized, while retaining perfect alignment with foreground objects, makes table layouts an attractive option. Tables (and sometimes images) with their dimensions specified as a percentage of the available space are a fine way of allowing your designs to adapt to their environment.■



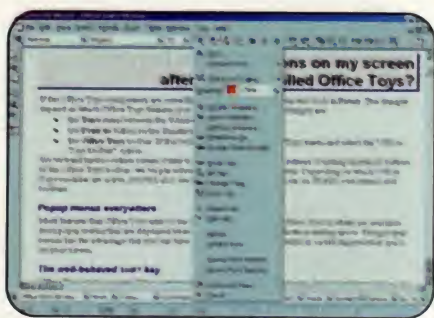
Each month this page lists all the Shareware files to be found on **apcmag.cd**. Simply browse to the Workshop section to find the files and related reviews.

# Shareware summary

## Windows 95

### Office Toys 98.2

A powerful add-on package for Word 97 which increases productivity by speeding up common tasks.



### The Spreadsheet Assistant 4.0

A very useful add-on for Excel 5 and above. Particularly good for manipulating large worksheets rapidly.

### The Risk Analyzer 7.4.98

A powerful tool for Excel 5 and above, providing a straightforward way to develop detailed risk analyses for business and investment proposals.

### Word Web Pro 1.6

A sophisticated dictionary/thesaurus program which can be plugged into Word 97 (and several other word processors).

### Woody's Office Power Pack 1.4

A large package of utilities and add-on modules for Word 97, including a full-featured envelope printer.

## OS/2

### System Resources 3.31

Features range from a basic digital clock to advanced virtual memory mapping, but the lack of a GUI lets it down considerably.

### PMPatrol

An old favourite — and it comes bundled with an integrated package of system utilities.

### PMSysMon

It has a great GUI and loads of features, it's multithreaded and monitors and displays everything you ever wanted to know about your workstation, from the obvious to the downright useful.

### The System Information Pad

Here's what the original OS/2 Launch Pad should have looked like — sure it's bigger, but it shows what we *really* need to know, without any useless extras.



## Mac

### Hotline 1.2.3

Allows fast connections with Hotline servers, providing their own brand of news, chat and files for special-interest topics, with good speed and resumable downloads.

### Kaleidoscope 2.0.1

Kaleidoscope 2.0.1 is the newest version of the enormously popular interface enhancement for Mac OS. It modifies fonts, windows, toolbars, folders and files.

### OTTool 1.0

A reliable and complete network assistant for use with Ethernet, AppleTalk and TCP/IP.

### StuffIt Expander 4.5

The latest update to the most popular file decompressor/decoder for Mac OS. An essential for any Internet user.

### DropStuff with Expander Enhancer 4.5

DropStuff provides a drag-and-drop file compressor along with an essential expansion of StuffIt Expander's abilities.

### Graphic Converter 3.3.1

A good image viewing application for Mac OS, with a huge list of compatible file formats and some very useful image editing tools.

### Patched VFW Utilities 1.1

The tools you need to convert QuickTime to AVI without the hassle.

## Linux

### POV-Ray

Raytracing is a method used to create 3D images with computers. It can produce



high-quality photorealistic images of virtually anything imaginable.

### Sced

One of the essential tools for serious 3D work is a scene modeller. It provides a sophisticated means for visualising and managing objects.

### Moonlight Creator

A modelling and rendering application which provides an integrated visual environment for the development of 3D images.

### Blender

Blender is the inhouse computer animation software of Dutch production company NeoGeo.

### Blue Moon Rendering Tools

A powerful series of command-line utilities for rendering images according to Pixar's RenderMan standard.■



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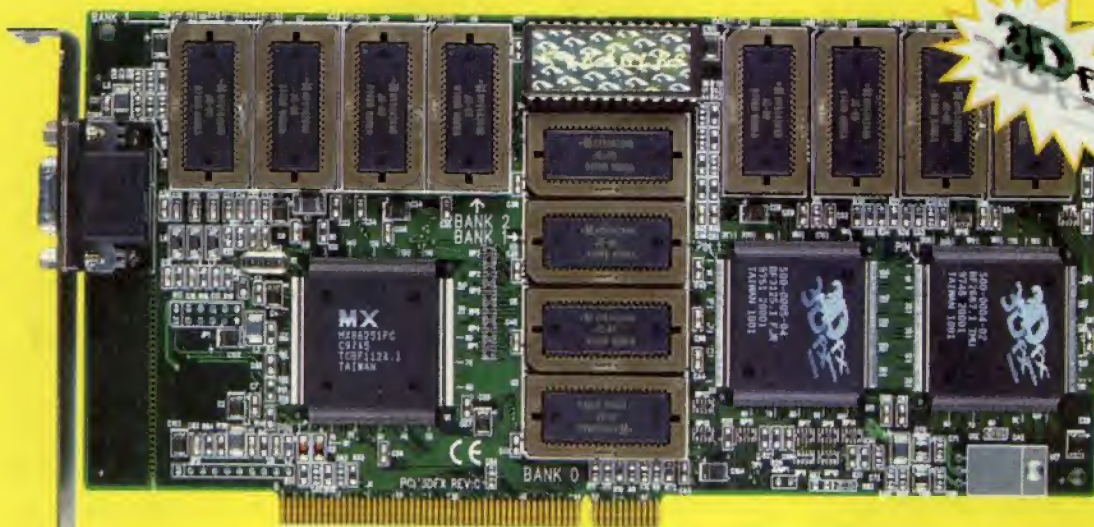
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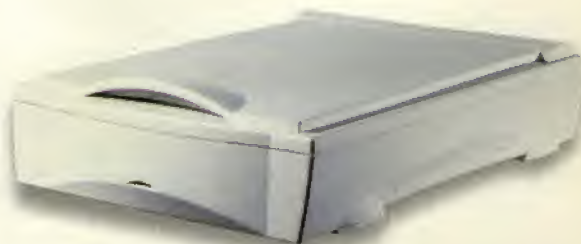
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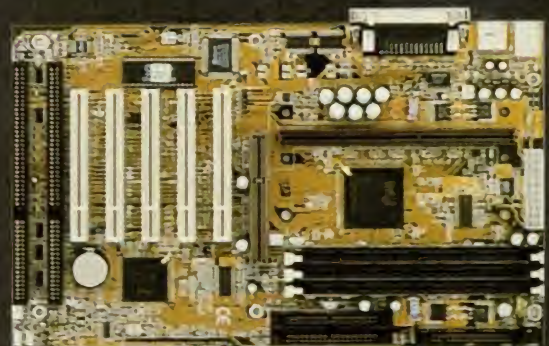
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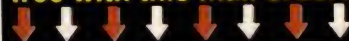
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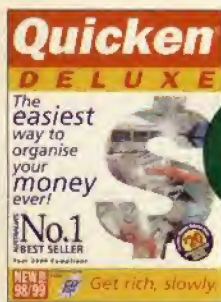
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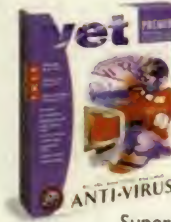
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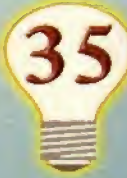
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S2 CPU Power Off	Yes	35 Watts	5 Seconds
S3 Suspend-to-RAM	No	2.5 Watts	8 Seconds
S4 Suspend-to-Disk	No	1 Watt	40 Seconds
S5 Soft Off	Yes	1.5 Watts	..

(\*) Note

\*\*\*\*\*

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PC 100MHz CPU



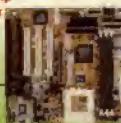
PC 100MHz CPU



PC 100MHz CPU



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(\* Note) The estimated data mentioned above are driven under the following configuration: Pentium III 300MHz CPU, ASUS 64MB SDRAM with SIEMENS chips (HYB39516800A1-8), Seagate ST32122A 2GB HDD, ASUS AGP-V264GT3, High Power HPC-250G1 (Rev. A0-01), Running Windows GDI Demonstration Application.



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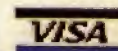
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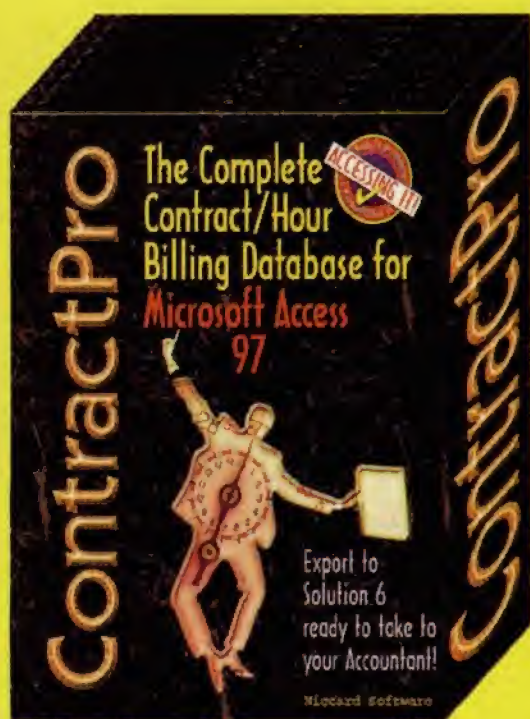




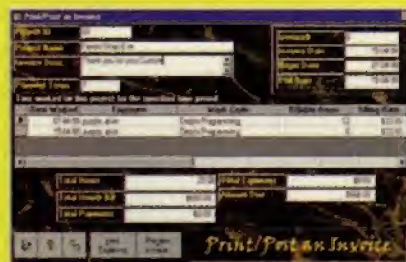
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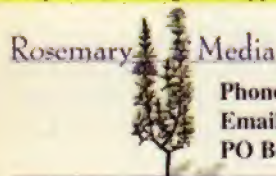
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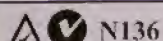
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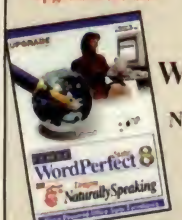
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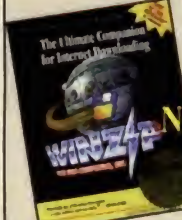
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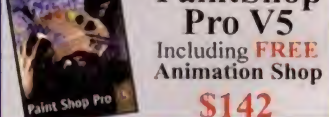
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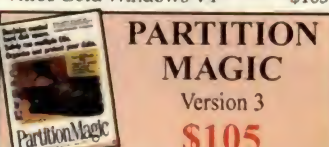
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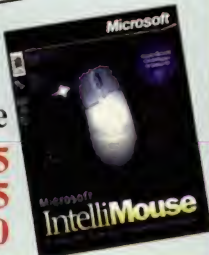
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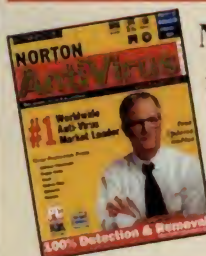
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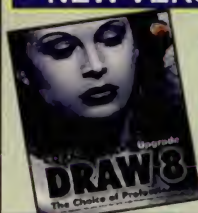
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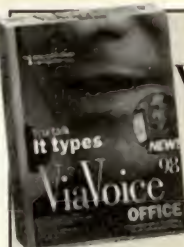
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9  
7  
16  
45  
7  
6  
6  
8  
8  
12  
12  
6  
12

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21-BKL  
3-BKL  
4-BKL  
5-BKL  
19-BKL  
18-BKL  
8-BKL  
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3x12  
3x8  
3x30  
3x12  
3x3  
3x4  
3x12  
3x12  
3x6  
12/Colour

#### Kit Code

22-CLR  
25-CLR  
10-CLR  
17-CLR  
14-CLR  
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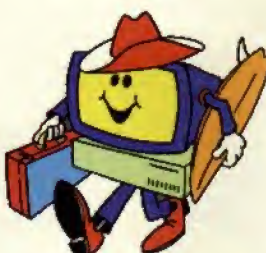
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CANON BJC 7000	6	C16
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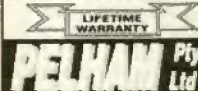
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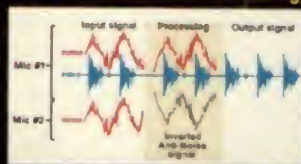
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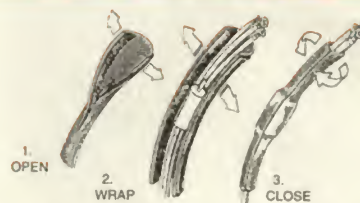


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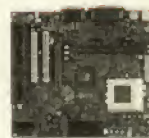
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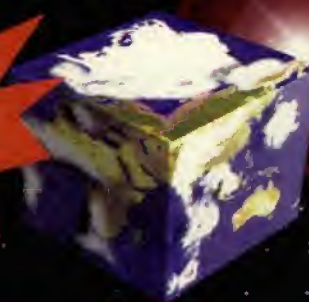
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Our new, significantly larger premises will comprise a sixty space car park and a fully featured show room for your convenience, not to mention more support staff to cater towards your needs. It doesn't stop there, we will also have a new automated PC production facility, with quicker turn around times, which translates into less waiting time for your new PC.

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64MB-100MHz SDRAM  
6.4GB Ultra ATA Hard Drive  
32 Speed CD-ROM Drive  
SoundBlaster PC164 Sound Card  
300 Watt Speakers  
8MB Matrox Millenium G200  
17" SVGA Monitor  
MS Intellimouse and Pad  
104k Keyboard  
ADE ATX Case  
Windows 98  
Vet Anti-Virus

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36 month term

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SYADE024

### Power Advantage PII-400

Intel 400Mhz Pentium® II with MMX™  
64MB PC-100MHz SDRAM  
8.4GB Ultra ATA Hard Drive  
8MB Matrox Millennium G200  
32 Speed CD-ROM Drive  
SoundBlaster PCI64 Sound Card  
300 Watt Speakers  
17" Colour Monitor  
MS Intellimouse and Pad  
104k Keyboard  
ADE ATX Case  
Windows 98 & IE 4.0  
Vet Anti-Virus

RentSmart for  
**\$33.45 p/w**  
36 month term

**\$3695**

SYADE032

### Power Advantage PII-450

Intel 450Mhz Pentium® II with MMX™  
64MB PC-100MHz SDRAM  
8.4GB Ultra ATA Hard Drive  
8MB Matrox Millennium G200  
32 Speed CD-ROM Drive  
SoundBlaster PCI64 Sound Card  
300 Watt Speakers  
17" Colour Monitor  
MS Intellimouse and Pad  
104k Keyboard  
ADE ATX Case  
Windows 98 & IE 4.0  
Vet Anti-Virus

RentSmart for  
**\$36.23 p/w**  
36 month term

**\$3995**

SYADE037

### Advantage Gamer PII-333

Intel 333Mhz Pentium® II with MMX™  
64MB SDRAM  
6.4GB Ultra ATA Hard Drive  
8MB i740 Graphics Card  
12MB Righteous 3D Voodoo 2 Accelerator  
32 Speed CD-Rom  
Storm VX PCI Sound Card  
300 Watt Speakers & Sub Woofer  
17" Colour Monitor  
MS Intellimouse and Pad  
104k Keyboard  
ADE ATX Case  
Windows 98.  
Vet Anti-Virus

RentSmart for  
**\$30.95 p/w**  
36 month term

**\$3395**

SYADE033

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## DTK Systems

## DTK APRI-80M/P350

- Intel Pentium II 350MHz
- Intel 440BX Chipset
- 64MB SDRAM
- 6.4GB Ultra ATA Hard Disk
- Intel i740 AGP 8MB
- 15" SVGA Monitor
- S3 Sonic PCI Sound
- 32 Speed CD-ROM
- 100W Amplified Speaker
- Mid-Tower Case
- Mouse/104 Keyboard
- MS Windows 98

SYDTK000

**\$2995**RentSmart for  
\$34 P/W  
36 month term3 YEAR  
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desktop systems

## DTK APRI-80M/P400

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- Intel 440BX Chipset
- 64MB SDRAM
- 6.4GB Ultra ATA Hard Disk
- Intel i740 AGP 8MB
- 17" SVGA Monitor
- S3 Sonic PCI Sound
- 32 Speed CD-ROM
- 100W Amplified Speaker
- Mid-Tower Case
- Mouse/104 Keyboard
- MS Windows 98

SYDTK001

**\$3495**RentSmart for  
\$34 P/W  
36 month termRentSmart for  
\$31.62 P/W  
36 month termIntel Pentium 450MHz MODEL - **\$3750** SYDTK002

## DTK APRI-82/C300

- Intel Celeron 300MHz
- Intel 440EX Chipset
- 32MB SDRAM
- 4.3GB Ultra ATA Hard Disk
- 4MB AGP Graphic Card
- 15" SVGA Monitor
- 16-bit 3D Sound Card
- 32 Speed CD-ROM
- 100W Amplified Speaker
- MicroATX Tower Case
- Mouse/104 Keyboard
- MS Windows 98

SYDTK005

**\$1795**RentSmart for  
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## DTK APRI-82/C333

- Intel Celeron 333MHz
- Intel 440EX Chipset
- 32MB SDRAM
- 4.3GB Ultra ATA Hard Disk
- 4MB AGP Graphic Card
- 15" SVGA Monitor
- 16-bit 3D Sound Card
- 32 Speed CD-ROM
- 100W Amplified Speaker
- MicroATX Tower Case
- Mouse/104 Keyboard
- MS Windows 98

SYDTK006

**\$1895**RentSmart for  
\$21 P/W  
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## DTK APRI-82/P333

- Intel Pentium II 333MHz
- Intel 440EX Chipset
- 64MB SDRAM
- 6.4GB Ultra ATA Hard Disk
- 4MB AGP Graphic Card
- 15" SVGA Monitor
- 16-bit 3D Sound Card
- 32 Speed CD-ROM
- 100W Amplified Speaker
- MicroATX Tower Case
- Mouse/104 Keyboard
- MS Windows 98

SYDTK003

**\$2450**RentSmart for  
\$24 P/W  
36 month term

## FortisPro

2 YEAR  
WARRANTY

## DTK AMDK6-300

- 12.1" Active Colour TFT LCD
- AMD K6-300MHz CPU with MMX™
- Intel TX Chipset, 512KB Cache
- 32MB RAM
- 3.2 GB Hard Disk
- ESS 1869 16-Bit Stereo, 3D Audio
- 2MB EDO Video Ram
- 89-Key Win95 Keyboard, Touchpad
- PCMCIA Port (1x Type III or 2x Type II)
- 1xSerial, 1xParallel, 1xPS/2, 1xGame, 1xTV OUT, 1xFir, 1xUSB, 1xExt Monitor Ports
- 20x CD-ROM
- 1.44MB FDD w/External Cable
- Li-Ion Battery
- AC/DC Adaptor, Carry Bag
- Windows 98

NBDTK002

**\$3495**RentSmart for  
\$34.05 P/W  
36 month term



# AMD

# AMD



Adelong Computers

## Experience the New Reality with the AMD-K6<sup>®</sup>-2 Processor

### AMD-K6-2 PROCESSOR - WITH 3DNow!™ TECHNOLOGY

- Leading-Edge Performance
- Lifelike Images and Graphics
- Big-Screen Sound & Video
- Ultimate Internet Experience

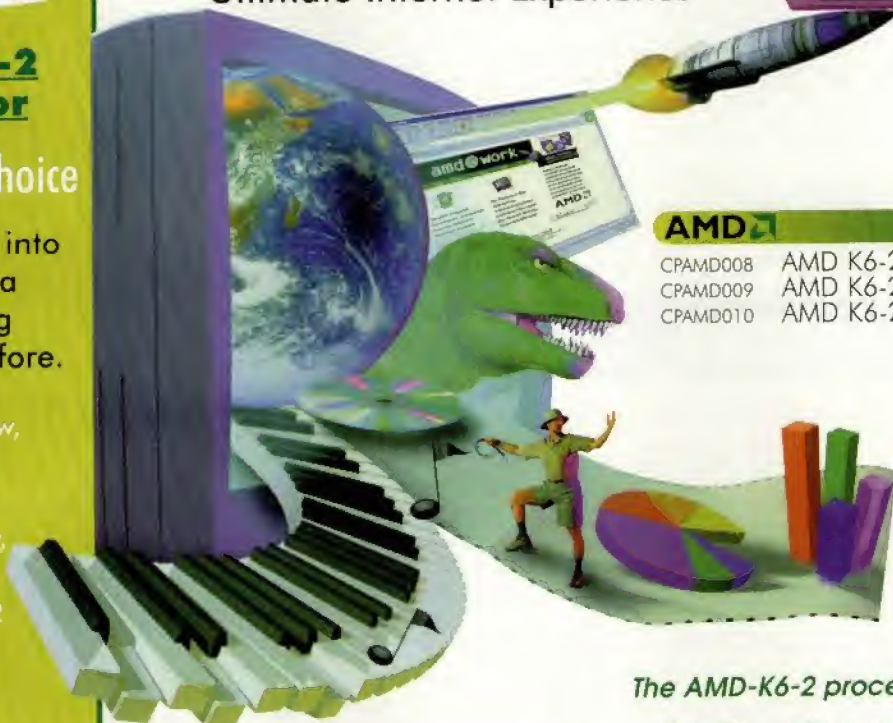


### AMD-K6-2 Processor

### The Smart Choice

PC users are into multimedia computing like never before.

With the new, innovative 3DNow!™ technology, the AMD-K6-2 processor delivers better overall performance\* and a superior experience for Windows® computing.



### AMD

CPAMD008	AMD K6-2 266	<b>\$245</b>
CPAMD009	AMD K6-2 300	<b>\$325</b>
CPAMD010	AMD K6-2 350	<b>\$Call</b>



The AMD-K6-2 processor brings leading-edge multimedia computing to the mainstream. With the AMD-K6-2 processor, PC users get the ultimate in 3D realism and performance-for a realistic price.

#### Home Advantage 266

AMD-K6-2/266MHz with MMX  
32MB SDRAM  
3.2GB Ultra ATA Hard Disk  
24/32 Speed CD-ROM Drive  
PCI 3D Sound Card  
100W Amplified Speakers  
4MB Virge 3D Graphics Accelerator  
15" Colour Monitor  
Logitech Mouse & Pad  
104 Key Windows Keyboard  
ADE Minitower Case  
Microsoft Windows 98

RentSmart for  
**\$17.54 p/w**  
36 month term

**\$1595** SYADE030

#### Home Advantage 300 - with 3DNow!™

AMD-K6-2/300 - with 3DNow! Technology  
64MB SDRAM  
4.3GB Ultra ATA Hard Disk  
24/32 Speed CD-ROM Drive  
PCI 3D Sound Card  
300 Watt Speakers  
4MB AGP Graphics Card  
15" Colour Monitor  
Mouse & Pad  
104 Key Windows Keyboard  
ADE Minitower Case  
Microsoft Windows 98

RentSmart for  
**\$19.38 p/w**  
36 month term

**\$1995** SYADE036



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## Processors

Code	Model	Price
CPINT011	Pentium II 300	<b>\$495</b>
CPINT014	Pentium II 333	<b>\$545</b>
CPINT015	Pentium II 350	<b>\$775</b>
CPINT016	Pentium II 400	<b>\$1175</b>
CPINT017	Pentium II 450	<b>\$1545</b>
CPINT019	Celeron 300	<b>\$255</b>
CPINT020	Celeron 300 with Cache	<b>\$349</b>
CPINT021	Celeron 333	<b>\$495</b>

## AMD

Code	Model	Price
CPAMD008	AMD K6-2 266	<b>\$245</b>
CPAMD009	AMD K6-2 300	<b>\$325</b>
CPAMD010	AMD K6-2 350	<b>\$Call</b>



Code	Model	Price
CPIBM006	M2-233MHZ	<b>\$125</b>
CPIBM007	M2-266MHZ	<b>\$169</b>
CPIBM008	M2-300MHZ	<b>\$199</b>

## Memory

**EDO RAM** - For use in newer 486 systems and most Pentium / Pentium Pro style systems. Used in pairs in Pentiums & Pentium Pro's.

Code	Model	Price
RAGEN004	8MB EDO SIMM 72 Pin	<b>\$30</b>
RAGEN005	16MB EDO SIMM 72 Pin	<b>\$39</b>
RAGEN006	32MB EDO SIMM 72 Pin	<b>\$79</b>

**Parity RAM** - This error checking ram is used with older desktop systems and servers.

Code	Model	Price
RAGEN011	4MB SIMM 72 Pin	<b>\$35</b>
RAGEN012	8MB SIMM 72 Pin	<b>\$49</b>
RAGEN013	16MB SIMM 72 Pin	<b>\$59</b>

**SDRAM** - For use in current Pentium / Pentium II systems utilising Intel TX / LX / BX Chipsets. 100MHz for Intel BX Chipsets. Use individually. All SDRAM is 168 Pin.

Code	Model	Price
RAGEN008	32MB SDRAM	<b>\$85</b>
RAGEN009	64MB SDRAM	<b>\$199</b>
RAGEN021	128MB SDRAM	<b>\$389</b>
RAGEN022	64MB 100MHz SDRAM	<b>\$215</b>
RAGEN023	128MB 100MHz SDRAM	<b>\$395</b>

\* For use with BX Mainboards

**Fast Page RAM** - For use in older 486 & Pentium systems and some printers. Use in pairs in Pentiums.

Code	Model	Price
RAGEN001	8MB SIMM 72 Pin	<b>\$35</b>
RAGEN002	16MB SIMM 72 Pin	<b>\$55</b>
RAGEN003	32MB SIMM 72 Pin	<b>\$85</b>



## Hard Disks

For details on Seagate and Western Digital Hard Drives see page 8 & 9.

## Quantum Fireball SE

Quantum is renowned for **quality** and **performance**. It has a fast average seek time - 9.5 milliseconds and internal data rates up to 158 megabyte per second at 5400 rpm. It also uses the Ultra ATA interface, with a data burst transfer rate of 33.3 megabytes per second. Furthermore the **Fireball SE is available in both IDE and SCSI models**.

## IDE 3.5" - Fireball

Code	Model	GB	Cache	I'Face	Motor RPM	Price
HDQTM028	Fireball EL	5.1	128KB	UDMA	33MB/s	<b>\$345</b>
HDQTM029	Fireball EL	7.6	128KB	UDMA	33MB/s	<b>\$495</b>
HDQTM030	Fireball EL	10.2	128KB	UDMA	33MB/s	<b>\$675</b>

## SCSI 3.5" - Fireball SE Ultra SCSI

Code	Model	GB	Cache	I'Face	Motor RPM	Price
HDQTM023	Fireball SE	3.2	512KB	Ultra	20MB/s	<b>\$470</b>
HDQTM024	Fireball SE	4.3	512KB	Ultra	20MB/s	<b>\$575</b>
HDQTM025	Fireball SE	6.4	512KB	Ultra	20MB/s	<b>\$725</b>
HDQTM026	Fireball SE	8.4	512KB	Ultra	20MB/s	<b>\$925</b>



IBM maintains a commitment to **innovation, reliability, and customer value**.

- The **Deskstar** incl. an Ultra DMA/33 interface.
- IBM's **Ultrastar** combines **fast rotational latency** and **rapid seek times** with a new custom controller that incorporates command queuing.

## IBM Ultra DMA33 - DESKSTAR HERCULES

Code	Model	GB	Cache	I'Face	Motor RPM	Price
HDIBM006	DHEA 34331	4.3	512KB	UDMA	5400	<b>\$359</b>
HDIBM007	DHEA 36480	6.4	512KB	UDMA	5400	<b>\$395</b>
HDIBM008	DHEA 38451	8.4	512KB	UDMA	5400	<b>\$505</b>

## IBM SCSI - ULTRASTAR 9ES DRACO

Code	Model	GB	Cache	I'Face	Motor RPM	Price
HDIBM009	DDRS 34560-50	4.5	512KB	Ultra	7200	<b>\$655</b>
HDIBM010	DDRS 34560-68	4.5	512KB	U/W	7200	<b>\$695</b>
HDIBM011	DDRS 39130-50	9.1	512KB	Ultra	7200	<b>\$1210</b>
HDIBM012	DDRS 39130-68	9.1	512KB	U/W	7200	<b>\$1265</b>

new



## Audio &amp; Visual

## Generic Sound Cards

Code	Model	Price
MMGEN005	Generic 16-Bit PnP Sound Card	<b>\$35</b>
MMGEN019	Generic S3 PCI Sound Card	<b>\$65</b>

## Generic Display Cards

Code	Model	Price
DCGEN008	2 MB S3 Virge card (PC1)	<b>\$75</b>
DCGEN011	4MB 3D AGP Graphics Card	<b>\$85</b>
DCGEN012	8MB i740 AGP Graphics Card	<b>\$165</b>



# Mainboard

# Chaintech

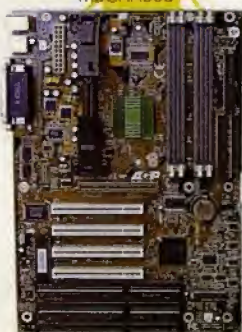


Adelung Computers

In a continuing campaign to give it's customers more and more value for their money, CHAINTech is bundling a total virus protection solution with their mainboards, absolutely free of charge. The 100% virus protection solution consists of a unique bootsector protection program which is built-in to the mainboard's BIOS, called ChipAway Virus, and the award winning PC-Cillin v3.0 (OEM version) virus protection program.

**\$275**

MBCHA003



## CHAINTech 6BTM

### System Processor:

- Supports up to 450MHz Intel Pentium II processors
- Slot 1 CPU socket with retention mechanism
- Supports 66/100MHz system clock speeds
- Innovative CPU technology (simple CPU installation via BIOS)

### ChipSet:

- Intel 82440BX two chip PCISet

### Bios:

- Award System BIOS with PnP, APM, DMI, CPU throttling and Multi-device booting features

### Ultra DMA-33 IDE Ports:

- Supports up to PIO Mode 4, Multi-word DMA Mode 2 and Ultra DMA-33 timings
- Bus Mastering software drivers for all well-known multi-task operating systems.

**\$199**

MBCHA001



## CHAINTech 6LTM2

### System Processor:

- Supports up to 333MHz Intel Pentium II processors
- Slot 1 CPU socket with retention mechanism Supports 60/66 Mhz system clock speeds
- Innovative SeePU technology (Jumper free CPU installation via BIOS)

### ChipSet:

- Intel 82440LX two chip PCISet
- AGP (Accelerated Graphics Port) Slot
- DRAM Memory Supports up to 384Mb EDO and Synchronous DRAM modules

### PCI IDE:

- Supports up to PIO Mode 4, Multiword Mode 2 and Ultra DMA-33



## CHAINTech 6BDA

**System Processor** Supports up to 26450MHz Intel Pentium® II processors

- Slot 1 CPU socket with retention mechanism
- Supports 66/100 MHz system clock speeds
- Innovative SEEPU technology (simple CPU installation via BIOS)

**ChipSet Intel 82440BX** two chip PCISet Accelerated Graphics Port (AGP)

### DRAM Memory

- Supports up to 512MB EDO and Synchronous DRAM modules
- Provides single-bit ECC capability

### Two Ultra DMA-33 IDE Ports

- Supports up to PIO Mode 4, Multiword Mode 2 and Ultra DMA33 timings
- Bus Mastering software drivers for all well-known multi-task operating systems

### Ultra2 SCSI with RAIDport III On Board

- AIC 7880 SCSI controller and AIC-3860 chip, supports up to 80Mbps(Ultra2 SCSI)
- Supports Adaptec ARO-1130CA C RAID card for RAID system upgradability

### ATX Form

MBCHA004

**\$649**

## CHAINTech 6ESA

**System Processor** Supports up to 333MHz Intel Pentium® II & Celeron® processors

- Slot 1 CPU socket with low cost retention mechanism
- Supports 60/66 MHz system clock speeds
- Innovative SEEPU technology (simple CPU installation via BIOS)

**ChipSet Intel 82440EX** two chip PCISet

### Accelerated Graphics Port (AGP)

### DRAM Memory

- Two 168-pin DIMM sockets support up to 256MB EDO and Synchronous DRAM• Provides single-bit ECC capability

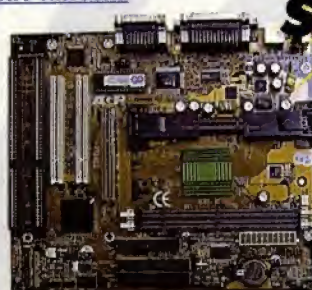
### Two Ultra DMA-33 IDE Ports

- Supports up to PIO Mode 4, Multiword Mode 2 and Ultra DMA33 timings
- Bus Mastering software drivers for all well-known multi-task operating systems

### Audio Subsystem

- Yamaha SA3 16-bit stereo audio controller
- Programmable sample rates from 5.5KHz to 48KHz for record and playback with full-duplex DSD capability
- Supports DLS(Downable Wavetable Sounds) wavetable synthesiser with limitless varieties of instrument samples using system DRAM

### Micro-ATX Form



**\$209**

MBCHA005



new

**\$169**

MBCHA006

AMD-K6-2 compatible

## CHAINTech 5AGM2

**System Processor** Supports up to 233MHz Pentium processors with MMX™ technology

- Supports Intel Pentium OverDrive processors (P54CTB)
- Supports PR120+ -PR200+ Crix/IBM 6x86™ (processor rev. 2.7 or later)/6x86L™ processors and PR166+ -PR266+ 6x86MX and MII-300 processors
- Supports 166-350MHz K6™ and K6-2™ processors
- Supports 180-200MHz IDT WinChip MMX processors
- High-efficiency Switching Power module
- Supports 60/66/100 MHz system clock speeds
- Supports 2.0-3.5v CPU core voltage

**ChipSet VIA MVP3** (82C598AT/82C586) two chip AGPset

### Accelerated Graphics Port (AGP)

**L2 Cache**•512KB built-in Pipeline Burst SRAM

### DRAM Memory

- Three 168-pin 3.3v unbuffered DIMM sockets support up to 256MB FP, EDO, Synchronous DRAM modules

### Two Ultra DMA-33 IDE Ports

- Supports up to PIO Mode 4, Multiword DMA Mode 2 and Ultra DMA33 timings
- Bus Mastering software drivers for all well-known multi-task operating systems

Two USB Ports On Board / FCC Class B & CE EMI Regulation Compliant

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WD Caviar®



Average Read Seek	9.5 ms
Rotational Speed	5400 RPM
Buffer	256 KB

## PHYSICAL SPECIFICATIONS

	Formatted Capacity	Model Number	
HDWES001	2.5 GB	WDAC12500	<b>\$275</b>
HDWES002	4.3 GB	WDAC24300	<b>\$325</b>
HDWES003	6.4 GB	WDAC36400	<b>\$389</b>
HDWES004	8.5 GB	WDAC38400	<b>\$500</b>
HDWES005	10.1 GB	WDAC310100	<b>\$630</b>

Western Digital's latest family of Caviar hard drives, and proven drive technology with an areal density of 2.875 GB per platter.

Using the industry-recognized 3.5-inch, low-profile WD Caviar design, these drives incorporate leading-edge magnetoresistive head technology to meet increasing capacity requirements. Read and write elements in the MR head are separate in order to optimize read and write capabilities. The read element, composed of a thin-film material whose resistance changes in the presence of a magnetic field, produces a strong signal allowing significant increases in areal densities.

These drives support Mode 4 PIO, Mode 2 DMA, and Ultra MB/5--double the current burst transfer rate. This results in maximum disk performance under PCI local bus environments.

- **MR Head Technology** - Magnetoresistive heads provide separate read and write elements, allowing optimization of the two functions for increased areal density and improved performance of the hard drive.
- **Ultra DMA/33 High-speed Host Transfers** - Doubles the current transfer rate under local bus environments.
- **S.M.A.R.T.™** - Assists the use in preventing possible system down time by warning users of the impending risk of data loss.
- **Exceptional Quality** - Guaranteed compatibility and automatic defect management allows easy installation. A three year warranty and 400,000 MTBF means years of trouble-free operation.



# Seagate

# Seagate

ADE  
AUSTRALIA

## Seagate Medalist

Seagate Medalist, EIDE drives from the worlds largest hard drive manufacture. They combine performance with great reliability. Designed for multimedia systems it has a seek time of 11ms, a motor speed of 5400rpm and supports the Ultra ATA interface.

### EIDE - Medalist

Code	Model	GB	Cache	I/Face	Motor RPM	Price
HDSGT018	Medalist	3.2	128KB	Ultra ATA	4500	\$270
HDSGT019	Medalist	4.3	128KB	Ultra ATA	5400	\$305
HDSGT016	Medalist	6.5	128KB	Ultra ATA	5400	\$385
HDSGT020	Medalist	8.6	128KB	Ultra ATA	5400	\$500

## Seagate Medalist Pro

One of the first 7200rpm EIDE drives available. It runs at a blazing 7200rpm and supports the Ultra ATA interface. The Medalist Pro range is geared for the power user and has a super fast seek time of 9.5ms.

### EIDE - Medalist Pro

Code	Model	GB	Cache	I/Face	Motor RPM	Price
HDSGT021	Medalist Pro	6.5	512KB	Ultra ATA	7200	\$490
HDSGT022	Medalist Pro	9.1	128KB	Ultra ATA	7200	\$705

## Seagate Barracuda

For high end servers where performance is vital. The barracuda range come in Ultra or UltraWide SCSI interfaces. These drives are manufactured to unparalleled performance and reliability.

### SCSI - Seagate Barracuda

Code	Model	GB	Cache	I/Face	Motor RPM	Price
HDSGT011	Barracuda 4XL	4.5	512KB	Ultra	20MB/s	\$1045
HDSGT012	Barracuda 4XL	4.5	512KB	U/W	40MB/s	\$1150
HDSGT013	Barracuda 9	9.1	512KB	Ultra	20MB/s	\$1425
HDSGT014	Barracuda 9	9.1	512KB	U/W	40MB/s	\$1425
HDSGT023	Barracuda 18	18.2	512KB	U/W	40MB/s	\$2595



Adelung Computers

# Storm



## STORM VX 3D SOUND CARD

ACCELERATED PCI AUDIO

### The Ultimate 3D Sound Experience

Let Your ears experience the pin point accuracy of true interactive audio. Storm VX packs all the features you'd expect in a high-end audio product meaning you can crank it loud without any sense of distortion. Whilst maintaining compatibility with DOS and Windows games can experience realistic 3D sounds and music.

- Hardware Acceleration
- Aureal A3d Positional Audio
- 64 voice wavetable synthesis
- Direct Joystick Acceleration



**\$135**  
MMXIT000

**INTERACTIVE**  
**3D**

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## 3D &amp; Sound Cards

**NuSound 3D***The Ultimate in digital sound for Realistic 3D gaming!***Features:**

Aureal 3D audio that creates highly realistic and immersive 3D sounds the way they are in the real world. It will convince you that **sounds are above, behind and all around you.**

**Advanced Features:**

- Aureal Vortex AU8820 digital audio processor
- PCI BUS master with 18-channel DMA Interface
- Professional studio quality 64-voice wavetable synthesis
- Legacy DOS mode compatibility in Windows as well as Real Mode DOS
- Analog/digital gameport and MPU-401 UART

**BONUS Exciting A3D games include:**

- Jedi Knight • Ambush at Altyr 5 by LucasARTS Entertainment
- Shipwreckers by Psynosis • NuSound 3

**Righteous 3D - Bonus Pack!**

*The ultimate 3D accelerator for 3D games. 3D so real it must be Righteous!*  
**Award winning performance!**

Whether you're into serious flight sims or hard core mutant blasting, brace yourself for arcade action with Righteous 3D. Based on 3Dfx Interactive Voodoo Graphics, Righteous 3D delivers some of the same 3D capabilities found in arcade systems.

- Advanced filtering and anti-aliasing techniques produce smooth textured images.
  - High precision 3D accuracy generates realistic three dimensional objects.
  - Transparent and translucent effects like fog, smoke and haze create stunning atmospheric conditions.
- Images are sharp, clear and realistic.**

**BONUS Exciting 3D games include:**

- Sega Rally Championship - NEW by Sega PC
- Jedi Knight: Pathway to the Force - NEW by LucasArts Entertainment Company
- MechWarrior 2 with NetMech by Activision
- G-Police by Psynosis • Shadowmaster by Psynosis • Overboard by Psynosis • Scorched Planet - trial version by Criterion studios • Hellbender - Trial version by Microsoft

**Righteous 3D II 12MB****High performance VOODOO 2 3D accelerator!**

Righteous 3D II is a dedicated 3D accelerator that delivers arcade quality 3D graphics acceleration. It has full motion frame rate performance with all 3D features simultaneously accelerated.

**Features:**

8MB or 12MB EDO DRAM configurations with triple 64-bit memory architecture. Supports 3D game resolutions of up to 800 x 600 with Z-buffering and up to 1024 x 768 without Z-buffering Windows 95 Direct3D support.

Righteous 3D II is a dedicated 3D accelerator that works transparently with your 2D adaptor to render complex three dimensional environments in real-time.

**Righteous 3D II supports a wide range of today's leading 3D standards**

- including Windows 95 Direct3D. It comes bundled with:
- Battlezone by Activision
  - Jedi Knight™: Ambush at Altyr 5™ by LucasArts Entertainment Company
  - Incoming by Rage Software
  - G-Police by Psynosis
  - Final Reality™ - 3D Benchmark Utility by Remedy Entertainment & VNU European Labs.

Award  
Winning  
Performance



12MB **\$575**  
MMORC001



8MB **\$485** MMORC003



# Diamond

# DIAMOND



# Adelung Computers



## Sonic Impact S90

*True PCI Audio Fidelity for your Multimedia PC*

Sonic Impact S90 is the latest offering from Diamond's 3D sound card range. Immersive audio and realistic atmospheric effects including fog and underwater sounds, creates the most awesome game play. Accelerates Aureal's A3D and Microsoft's DirectSound and DirectSound3D and is 100% Sound Blaster compatible.

- >90db SNR, supports downloadable samples
- 64 Hardware wavetable voices
- PCI design 3D sound card
- A3D Hardware acceleration

**\$99**  
MMDIA008

## V.90 Upgrade Available SupraExpress 56K Modem

The SupraExpress 56k modem has been designed to deliver award-winning 56K performance over a wide variety of telephone line conditions.

- Ultra-fast 230Kbps UART
- Includes Internet, fax and data software
- Upgradeable to shotgun dual modem technology



EXTERNAL **\$220** FMDIA000  
INTERNAL **\$215** FMDIA001



## Viper V550

*The Next Generation!*

Looking for the most powerful graphics card on earth? Diamond's next-generation Viper V550 combines 16MB of fast SDRAM, a breakthrough dual-processing architecture and hardware OpenGL acceleration to deliver workstation levels of 2D and 3D power, lightning-fast 3D game play and support for software DVD.

- Available in PCI and AGP 2X configurations
- Hot software bundle (retail package)
- 16MB of SDRAM
- 128-bit dual processor architecture
- OpenGL and DirectX accelerates
- Software DVD support (AGP)

PCI **\$465** DCDIA016  
AGP OEM **\$420** DCDIA017

16MB

## Monster Sound MX200

*Fully Immersive Audio!!!*

Monster Sound MX200's revolutionary NASA audio technology, 64 hardware wavetable voices and PCI design make it the best audio accelerator for today's games. Supports Aureal A3D, DirectSound, DirectSound 3D.



**\$335**  
MMDIA000

- 4 speaker support for maximum 3D effects
- Accelerates 23 3D audio streams
- 4MB Roland wavetable sample
- Hardware A3D acceleration

(July 1998)



## Stealth II G460

8MB of AGP 2X Graphics Power

Let your PC show you brilliant colours and razor-sharp resolution. Stealth II G460 includes 8MB of SDRAM with AGP 2X power to make games and business applications come alive. Designed for use with Intel Pentium II processors.



- 8MB SDRAM
- Powerful 2D and 3D acceleration
- Supports Windows 95/98 and Windows NT 4.0

Retail Pack **\$275** DCDIA014  
OEM **\$195** DCDIA013

## FirePort UltraSCSI

*UltraSCSI with Diamond Performance*

- Supports Windows 95/98, Windows NT 4.0, Novell Netware
- External 50-pin connector means you don't need an extra adapter
- Top performance UltraSCSI just got affordable
- Free UltraEasy™ Diagnostics



FirePort 20 **\$169** CCDIA000

FirePort 40 **\$310** CCDIA001

FirePort 40 Dual **\$409** CCDIA002

## Monster 3D II

*Most Powerful Voodoo2 Acceleration!*

This is 3D more shockingly real than anything you've ever seen! Outrageous speed and deadly detail will transform your PC gaming into a mind blowing 3D experience. Can you meet the challenge of 100 frames/sec game play with 2 Monster 3D II's in SLI mode?



8MB **\$429** MMDIA003  
12MB **\$565** MMDIA007

- 60 frames/sec with a single card
- Supports Glide, Direct3D and OpenGL
- Hot game bundles in special retail packs

Sales staff are available (est) 9am-6pm Monday to Friday, 10am-4pm Saturday  
Technical Support (5 Days a week 9am-6pm) Phone (02) 9700 9354



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matrox

Graphics Cards



Extreme Games Acceleration  
At Unbelievable Frame Rates

## Mystique G200

- 128 bit DualBus High Performance Gaming Engine with full AGP 2X support.
- 8MB of graphics memory upgradeable to 16MB
- High Quality 3D rendering engine delivers blistering gaming performance.
- High octane video - engine for Mpeg1 and Mpeg2 video acceleration.
- PC to TV output, brings flicker free displays right to your television screens.

## Millennium G200

Superior Acceleration For Professional 2D/3D Graphics

- High speed 250MHz RAMDAC
- Fully multimedia upgradeable
- High quality 3D rendering engine
- High performance video card with full AGP 2X support
- New MGA-G200 128-bit DualBus graphics chip
- 8MB of graphics memory upgradeable to 16MB
- Advanced 2D, 3D, and software DVD video acceleration

"...the Matrox G200 gets the nod as the fastest 2D/3D card around."

PC Magazine August 98

PC  
MAGAZINE  
AUSTRALIA  
EDITORS'  
CHOICE

## Productiva G100

Acceleration For Demanding Business Graphics

- 64-bit AGP graphics card
- 8MB of powerful graphics memory
- High performance 2D business productivity
- Support for 3D and video-based business applications
- 1600 x 1200 desktop in true colour for demanding business documents



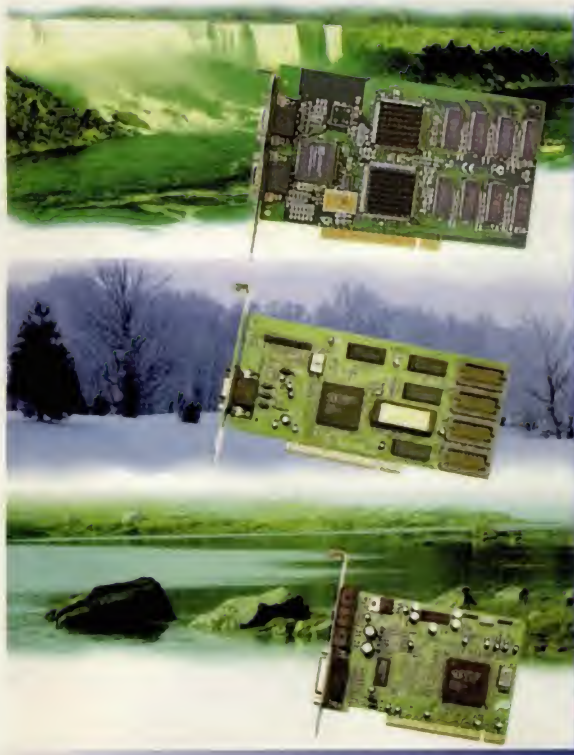
(8MB)  
**\$220**  
DCMAT021



# Generic, 3D & Sound Cards



Adelony Computers



## 3D FX VOODOO 3D Accelerator

*...for 3D graphic enhancement!*

### Features:

- High Performance 4MB card utilising industry leading 3DFX Voodoo Chipset
- Unrivalled games performance with electrifying frame rates
- Works with any conventional 2D card

DCEAG002

**\$150**



## S3 Virge Hardware 3D VGA Card

*...great as an interface between the monitor and the computer!*

### Features:

- High performance DRAM base 64 bit 2D/3D graphics engine
- Unique S3 Streams Processor for high quality performance
- DPMS 2.0 standard green PC power saving feature
- High quality/perf. 3D texture mapping
- Z Buffering for 3D video

DCEAG001

**\$53** (2MB)  
**\$66** (4MB)



## ES1938 (SOLO-1) PCI Sound Card

*...lifting your system to new heights!*

### Features:

- Single, high-performance, mixed-signal, 16-bit stereo VLSI chip
- PCI parallel bus interface, version 2.1
- High-Quality ESFM music synthesiser/dynamic range (SNR) over 80 dB
- Integrated Spatialiser 3D audio effects processors
- Full-Duplex operation for simultaneous record and playback
- Supports PC games/MSWin Sound Sys./Software Wavetable
- Meets PC 97/PC 98 and WHQL specifications

MMEAG001

**\$39**

# Creative



## Sound Blaster™ PCI64 MMCRE025 **\$195**

- Synthesis engine provides 64 voices of great wave-table msounds
- Support for Microsoft® DirectSound® and DirectSound 3D™ and derivatives audio technology in 2- and 4-speaker mode

Code	Model	Price
MMCRE011	Sound Blaster™ AWE64 Value	<b>\$155</b>
MMCRE012	Sound Blaster™ AWE64 Gold	<b>\$395</b>
MMCRE026	Sound Blaster™ Ensonique PCI	<b>\$115</b>
MMCRE013	Sound Blaster™ 16	<b>\$75</b>

## PC-DVD Encore Dxr2 MMCRE016 **\$555**

- DVD Player for TV & DVD Player for PC
- 20x Speed CD-ROM Drive
- 2nd Generation DVD-ROM Drive
- Video CD (H/W MPEG-1) Player
- Dxr2 Technology
- Dolby Digital (AC-3) Audio



# Modems



## Roadster II 56 ULTRA SVD ...

*The modem that can see, speak, listen & read!*

- Ultimate High speed 56Kbps download
- Supports V.90 Technology
- Voice, data and fax modem
- Lifetime warranty
- Free lifetime customer support



Code	Model	Price
FMNET007	InPlus 56K SVD Int.	<b>\$239</b>
FMNET012	Roadster II 56K Ultra SVD Ext.	<b>\$275</b>
FMNET013	PCMCIA CardModem 56K	<b>\$365</b>
FMNET008	PCMCIA CardModem 56K + Eth.	<b>\$500</b>

**\$275**  
FMNET012



**\$269**  
FMBAN003

*The Wave SP 56 supports both V.90 and K56flex standards to ensure you have no disruptions to your 56K modem connections.*

Sales staff are available (est) 9am-6pm Monday to Friday, 10am-4pm Saturday  
Technical Support (5 Days a week 9am-6pm) Phone (02) 9700 9354



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**56K Global Modem PC Card**

This innovative 56 Kbps Global PC Card modem is easily configured for use **worldwide** and features x2 technology for **high-speed downloads** over standard phone lines.

Connect easily to phone lines with the included cable connector. Insert your cable into the modem & then when travelling attach an adaptor for the country you are visiting; plug into a phone jack & you're ready to fax or access data from anywhere in the world.

**Features:**

- Real-time access and 56 Kbps downloads - faster than 28.8Kbps modems
- x2 Technology: Faster downloads with higher throughput
- World Ready: Access in more than 250 countries/regions
- Flash DSP
- Flash ROM
- Guaranteed Compatibility
- Intelligent Auto Install: Easy installation in minutes

**\$365**

FMROB009

**56K Voice Faxmodem**

The world's undisputed leader in high speed modems. **Internet access** couldn't be faster or easier with your "V.90 Technology" Faxmodem.

The new U.S. Robotics Faxmodem incorporates the new ITU V.90 standard in addition to the existing x2 Technology allowing you to download from the internet at up to 56Kbps. It's also fully compatible with other modems from 33.6Kbps down to 300bps.

**Features:**

- New ITU V.90 Technology
- Download at up to 56K from the Internet
- Send and receive faxes directly from your PC
- Voice mail and Speaker phone support
- Easy installation
- Limited lifetime warranty

**\$245**

FMROB006

**Courier Modem**

**Dual Standard V.34 Fax with V.32 bis. Courier is compatible with all popular protocols and ITU-T standards.**

It automatically detects and connects at the fastest available speed.

Fast Faxing is achieved:

V.17 at 14.4 Kbps, Group III, Class I & 2.0 with call detection.

**Features:**

- Flash ROM Upgradable: Designed with extra processing power-new software available from the US Robotics bulletin board service
- QuickConnect™: Completes handshake and begins transmission within 7 seconds
- Dial and Link Security with Dialback: Verifies authorised callers and modems

**\$479**

FMROB005

**SPIRIT****SPIRIT Products****PCMCIA****Spirit Scorpion 56** FMSP1009 **\$280**

The Spirit Scorpion 56 fax/modem PC Card offers the features of a desktop fax/modem in a small "credit-card" size. Both KFlex and V90. Ready, the Scorpion 56 is a breeze to install and comes supplied with a full complement of software. This PC Card enables the mobile professional to exchange data faster using a range of notebooks/palmtops running Win 3.1x/95/98/NT/CE.

**PCMCIA Ethernet Adaptor** NWSIP000 **\$150****MODEMS**

Now  
K56 Flex  
+ V.90



**560ISP Internal 56K Model**  
**\$169**



- Installation instructions & documentation
- Software: Internet dialler & browser, data terminal emulation software, send receive fax application and voice mail system

Code	Description	Price
FMSP1007	Spirit 560SP External 56k Fax/Modem SVD	<b>\$195</b>
FMSP1006	Int. 56K,SVD, Spk Ph.	<b>\$Call</b>

**Spirit 560SP External 56,000bps** FMSP1007 **\$195**

Internet Voice fax/modem with Speakerphone + SVD external 56k high speed fax/modem that supports the Rockwell K56Flex standard and popular data & fax standards up to 33,600bps. Hardware based error correction & data compression. Includes Windows fax and communications software with voice mail system, plus Windows Internet software.

**All Modems include:**

- 9/25 serial cable and Power supply(ext. model)
- Phone cord (all models)

**Spirit Ranger 56K****\$99** FMSP1008

**SPECIAL PRICE with any Adelong System. Call for details.**

**Multimedia****\$145**

MMSPI000

**Spirit TV Video Card**

Turn your PC into a TV. PCI card that brings full TV reception capabilities to your PC. Features full motion video and "still" capture.

**Networking**

Spirit networking includes a full complement of NICs and Hubs in 10, 100 and 10/100 configurations.

**5 Port Hub** NWSPI003 **\$99****PCI Network Cards** NWSPI002 **\$55****ISA Network Card** NWSPI001 **\$39****10/100 PCI NIC** NWSPI001 **\$125**



# Speakers

# JAZZ



Adelony Computers

**FREE**  
SOFTWARE WITH  
ALL SPEAKERS  
SOLD.  
1 AL UNSER JR  
2 FX FIGHTER  
3 TRACK FIGHTER  
EXPERIMENTS

MMJAZ027 **\$155**

## J-703

- 28 Watts RMS total power
- Wood cabinet
- 2 way speakers
- 4" woofer
- 2" tweeter
- Headphone jack
- Power on/off button
- Magnetically shielded
- 75-20,000Hz freq. response
- Volume, treble, bass controls
- 140mmx300mmx183mm (WxHxD)



MMJAZ028 **\$175**

## J-707

- 28 Watts RMS total power
- Wood cabinet
- 2 way speakers
- 5" woofer
- 2" tweeter
- Headphone jack
- Power on/off button
- Magnetically shielded
- 75-20,000Hz freq. response
- Volume, treble, bass controls
- 170mmx348mmx183mm (WxHxD)



**J-215** 40W  
**\$25** MMJAZ018



**JS-100** 128W  
**\$75** MMJAZ001



**JS-200** 200W  
**\$85** MMJAZ002



**JS-300** 450W  
**\$99** MMJAZ003

**Adjustable 3D Sound**  
The JS-200 & 300 offer customised 3D sound control not found on any other multimedia speaker.



**J-904** 200W  
**\$75** MMJAZ025



**JS-900** 300W  
**\$110** MMJAZ004



**J-818** 500W  
**\$185** MMJAZ019



Specifications	J-215	JS-100	JS-200	JS-300	JS-900	J-904	J-818
Total RMS Power	2W	8W	12W	28W	18W	10W	28W
Driver Configuration	3"	3"	3"	3" 3" 1"	4"	4"	4" 2"
Frequency Response	150Hz to 20KHz	75Hz to 20KHz	75Hz to 20KHz	50Hz to 20KHz	50Hz to 250Hz	50Hz to 250Hz	75Hz to 20KHz
3D Sound		•	•	•			
Adjustable 3D Sound				MUSIC THEATER GAME	MUSIC THEATER GAME		
<b>CONTROLS</b>							
Volume	•	•	•	•	•	•	•
Treble		•	•	•			•
Bass		•	•	•			•
Balance		•	•	•			
Tone							
Bass Boost							
Subwoofer Output Jack		•	•	•			
Headphone Jack	•	•	•	•			
Microphone Pass-through Jack		•	•	•			
Mute		•	•	•			
Dual Inputs		•	•	•			
Magnetically Shielded	•	•	•	•	•	•	•
Dimensions/mm (WxHxD)	78 x 179 x 119mm	127 x 280 x 127mm	127 x 280 x 127mm	127 x 280 x 127mm	150 x 224 x 330mm	160 x 123 x 240mm	140 x 300 x 183mm



## J-908ST

Subwoofer & Speaker

- Peak Music Power Output: **400W**
- Drivers: One 4" Subwoofer Cone  
One 3" Full Range Cone  
One 1" High Range Cone
- Freq Resp: Subwoofer 35Hz-250Hz  
Satellites 100Hz-15KHz
- 3D Controls: On/Off
- Controls: Power/Volume
- Input: 3.5mm Stereo Plug
- Output: RCA Jack
- Indicator: Power LED

MMJAZ015 **\$130**

## J-HS14 M/phone

Multimedia combination headset and boom microphone

MMJAZ009 **\$20**



## J-S124 M/phone

Desktop Microphone including base Input: 3.5mm Mini Stereo jack

MMJAZ008 **\$15**



Sales staff are available (est) 9am-6pm Monday to Friday, 10am-4pm Saturday  
Technical Support (5 Days a week 9am-6pm) Phone (02) 9700 9354



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## SparQ 1.0GB Drive

'The personal solution'.

A superb combination of high performance at an affordable price. Easily backup your laptop or desktop system in minutes. **SparQ** gives you the bandwidth you need for show-stopping multimedia presentations and archive your Internet downloads. Play your favourite games off a **SparQ** cartridge at twice the speed of a CD. Backup your computer in minutes. Transfer files, applications and operating systems from home to office for extreme flexibility and multitasking.



- Features:**
- 1.0 GB Capacity
  - Buffer/Cache: 512 KBytes
  - High Performance Hard Drive

**\$509**

- Bonus Software Incl:**
- Seagasoft Heat Net
  - Novastor Novadisk SE
  - Serif Drawplus 3.0 SE
  - Netresults WEBVCR
  - Alta Vista Howdy
  - SPRYNET
  - McAfee Webscan

Code	Model	Price
BUSYQ004	SPARQ 1.0GB EIDE INT	<b>\$509</b>
BUSYQ005	SPARQ 1.0GB PARALLEL EXT	<b>\$509</b>
BUSYQ009	SPARQ 1.0GB MEDIA PC	<b>\$95</b>

## SyJet 1.5GB Drive

'The personal solution'.

Award-winning high performance removable cartridge hard drive. Enough capacity to hold over 1,000 floppies on a 3oz. cartridge. The logical choice for professional musicians, audio mixers, digital video editors, graphic designers, webmasters, desktop publishers and game players. Fast enough to store, edit and run full-motion video. Holds more than 80 minutes of broadcast quality video. Record, edit and run your audio compositions for seamless playback. Holds over 2 hours of CD-quality audio. Create animation, audio and video sequences for multimedia presentations. Run directly off a **SyJet** cartridge. Work directly from **SyJet** and minimise clutter on your internal drives.



- Features:**
- 1.5 GB Capacity
  - Buffer/Cache: 512 KBytes
  - High Performance Hard Drive
  - Ground breaking technology
  - Portable drive/light weight
  - High speed, high volume

**\$709**

Code	Model	Price
BUSYQ000	SYJET 1.5GB IDE INT	<b>\$709</b>
BUSYQ001	SYJET 1.5GB SCSI EXT	<b>\$709</b>
BUSYQ002	SYJET 1.5GB SCSI INT	<b>\$709</b>
BUSYQ003	SYJET 1.5GB PARALLEL EXT	<b>\$709</b>
BUSYQ008	SYJET 1.5GB MEDIA PC	<b>\$179</b>

## EZFlyer™ 230 Drive

The **EZFlyer™ 230** combines the flexibility of a data cartridge with the speed of hard drive technology. Easy-to-use, small and lightweight, the drive can be carried around in your pocket. The **EZFlyer™ 230** provides more space just by adding more cartridges. Carry large graphics files in the palm of your hand. Excellent storage device for desktop publishing, pre-press, Internet, photography, multimedia, imaging, video, audio and back-ups. The **EZFlyer™ 230** features external SCSI and Parallel Port.



**\$375**

- Features:**
- 230 MB Cap., Int.EIDE
  - 13.5 msec average seek time
  - External SCSI & Parallel Port
  - Superior HD performance
  - Small and lightweight
  - Auto eject button

Code	Model	Price
BUSYQ006	EZFLYER 230MB SCSI EXT	<b>\$375</b>
BUSYQ007	EZFLYER 230MB PARALLEL EXT	<b>\$375</b>
BUSYQ010	EZFLYER 230MB MEDIA PC	<b>\$75</b>

**State-of-the-art technology for MAC & PC file storage!**



# lomega

ADE  
AUSTRALIA

Adelong Computers

## Jaz 2 Drive

*Want portability and blistering speed?*

The new lomega Jaz drives hold up to 2GB of data each whilst retaining 100% compatibility with older 1GB disks. Works with both MACs and PCs via an external SCSI interface.

JAZ 2GB DRIVE  
(SCSI EXT.)

JAZ 2GB DRIVE  
(SCSI INT.)

**\$845**  
BUIOM018

**\$845**  
BUIOM017

### Jaz 1GB

Code	Model	Price
BUIOM004	JAZ DRIVE (SCSI INT.) - 1.0GB	<b>\$560</b>
BUIOM003	JAZ DRIVE (SCSI EXT.) - 1.0GB	<b>\$595</b>



## lomega Buz

*All the hardware and software you need to be a video genius*

Introducing the lomega Buz

-the easiest way to get

multimedia from camcorders, DVD, CD-Roms, VCRs and laserdiscs

into your PC! It's a video capture and editing board combined with an Ultra SCSI controller that lets you:

- Capture Multimedia (fullmotion) video, sounds, digital pictures, music) into a PC
- Edit it using the easiest software around



**\$375**

BUIOM023

100  
zip



## Zip Plus

*One drive fits all*

New AutoDetect technology connects the ZipPlus drive to either SCSI or parallel ports, and works on either PC or Macintosh computers. Bundled with Zip tools and a new range of HOT multimedia software titles.

**\$359**

BUIOM011

- ImageAXS
- Recordit
- Webuddy
- Netcard
- Adobe photodeluxe

100  
zip

## Zip Drive

*Expand your hard drive without limits*

Heading Increase your storage quickly, easily and economically - as you need it. With 100MB Zip disks you can add as many disks as you need. Available in three types. Parallel / SCSI Mode / ATAPI



ZIP DRIVE EXT.  
SCSI - 100MB

**\$275**

BUIOM001

**\$275**

ZIP DRIVE EXT.  
PARALLEL - 100MB

BUIOM000

100MB ZIP INT IDE

**\$195**

BUIOM007



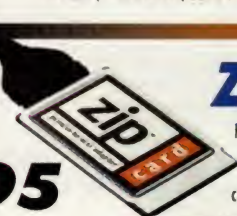
## Zip Card

PCMCIA to SCSI adapter. Zip card is a PCMCIA to SCSI adapter card that, when connected to your notebook computer and a SCSI Zip Drive, allows you to get 2-5 times the performance over a parallel port Zip Model.

**\$195**

BUIOM022

*...the fastest and most convenient way to run a zip drive on your notebook*



## Jaz Traveller

*Portability Solution...*

Jaz Traveller is a SCSI to parallel port converter for the Jaz drive. The Jaz Traveller allows you to connect an external Jaz drive to the parallel port on the IBM-compatible computers.



**\$95**

BUIOM013

## Media Accessories

Code	Model	Price	
BUIOM012	100MB PC ZIP DISKS (1 PER PACK)	<b>\$25</b>	BUIOM020 JAZ MEDIA 1GB PC DISK (1 PER PACK) <b>\$185</b>
	100MB PC ZIP DISKS (3 PER PACK)	<b>\$72</b>	BUIOM008 JAZ MEDIA 1GB PC DISKS (3 PER PACK) <b>\$530</b>
	100MB PC ZIP DISKS (10 PER PACK)	<b>\$225</b>	BUIOM024 JAZ MEDIA 2GB PC DISK (1 PER PACK) <b>\$205</b>
BUIOM014	ZIP DRIVE CARRY CASE	<b>\$25</b>	BUIOM025 JAZ MEDIA 2GB PC DISKS (3 PER PACK) <b>\$595</b>

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Technical Support (5 Days a week 9am-6pm) Phone (02) 9700 9354



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## Speakers

**Juster brings you the true sound from Multimedia Speaker Systems!**



### 3D-103 Subwoofer

- 1 x Subwoofer + 2 x Satellites
- Power output (PMPO): 500W
- Volume, Bass, Controls
- Power on/off LED
- Earphone output jack
- Frequency response:  
Subwoofer: 20-300 Hz  
Satellite: 150-20K Hz

**\$80** MMJUS000



### AC-691N Speakers

- Power output (PMPO): 120W
- Volume Controls
- Power on/off LED
- Earphone output jack
- Frequency response:  
Subwoofer: 80-20K Hz

**\$17** MMJUS003

### 3D-128 Subwoofer

- 1 x Subwoofer + 2 x Satellites
- Power output (PMPO): 800W
- Volume, Bass, Controls
- Power on/off LED
- Earphone output jack
- Frequency response:  
Subwoofer: 40-150 Hz  
Satellite: 150-20K Hz

**\$125** MMJUS001



### SP-650 Surround Sound

- Power output (PMPO): 480W
- Volume, Bass, Treble 3D Controls
- Power on/off LED
- Earphone output jack
- Frequency response: 40-20K Hz

**\$60** MMJUS002



## PHILIPS

## Monitors

3 YEAR ON SITE WARRANTY



1055

### 15" 13.8" VIS COLOUR MONITOR

- High-resolution 15" (13.8" VIS) autoscans
- Low-emission specifications comply with MPR-II standards
- Handles resolutions up to 1024 x 768 non-interlaced

**\$365**  
MOPHI000

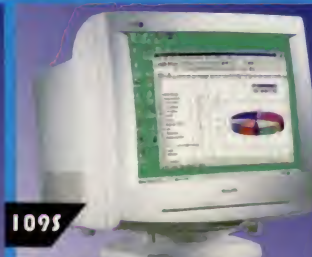


1075

### 17" 15.9" VIS COLOUR MONITOR

- 17" (15.9" VIS) colour monitor for use with all PC's
- Flicker-free display through high refresh rates up to 85 Hz (1024 x 768 mode)
- Flat Square screen with anti-glare and anti-static coating

**\$695**  
MOPHI001



1095

### 19" 17.9" VIS COLOUR MONITOR

- 19" (17.9" VIS) colour monitor with excellent front of screen performance for use with PC, Apple computers and workstations
- Flicker free displays are guaranteed through high refresh rates up to 75Hz at 1600 x 1200 or 85Hz at 1280 x 1024
- Fine high resolution  
0.22mm horizontal pitch

**\$1295**  
MOPHI002



201B

### 21" 19.6" VIS COLOUR MONITOR

- 21" (19.6" VIS) colour monitor with excellent front of screen performance for use with PC's, Apple Computers, workstations and X-terminals
- Flicker free display through high refresh rates up to 1600 x 1200 at 75 Hz
- Black Matrix Invar shadow mask for brilliant, high-contrast images

**\$2295**  
MOPHI003

## Control Cards & Networking

FOR ALL NETWORKING  
CABLES, SEE PAGE 26.

### GENERIC NETWORKING

Code	Model	Price
NWGEN000	ISA Ethernet Card (COMBO)	<b>\$29</b>
NWGEN001	PCI Ethernet Card (COMBO)	<b>\$35</b>
NWGEN002	5 PORT HUB with up-link port	<b>\$79</b>
NWGEN003	8 PORT HUB with up-link port	<b>\$99</b>
NWGEN004	16 PORT HUB with up-link port	<b>\$225</b>
NWGEN005	PCMCIA Ethernet Combo	<b>\$139</b>

### I/O CONTROL CARDS

Code	Model	Price
CCGEN000	ISA MULTI I/O	<b>\$35</b>
CCGEN015	ISA PRINT CARD	<b>\$20</b>

### ADAPTEC DESKTOP SCSI

Code	Model	Tfr Rate Mb/s	Price
CCGEN001	AHA-1520	10	<b>\$155</b>
CCGEN005	AHA-2940UW	40	<b>\$395</b>
CCGEN006	AHA-2940UWK	40	<b>\$620</b>
CCGEN011	AHA1460	20	<b>\$375</b>



# Networking

# D-Link



Adelony Computers



**\$65**  
NWDLI016

## DFE-530TX PCI-bus 10/100M fast Ethernet network interface card

Intelligent Ethernet/Fast Ethernet adaptor, Auto negotiating 10Base-T/100Base-TX, Plug and Play support, low CPU utilisation, 32 bit high performance bus master, Optional remote boot rom, Certified driver for Netware, SCO Unix, Windows 95 and Windows NT.



**\$120**  
NWDLI003

## DE-660CT PC Card Ethernet network interface card with RJ-45/BNC connectors, JITI function supported

PCMCIA card with RJ-45 & BNC connectors, Full plug and play, Autodetection of cable type, Supports full duplex, Netware, SCO Unix, Windows 95 and Windows NT compatible, Support D-link just-in-time-interrupt (JITI) technology, 30% faster than other standard PCMCIA card.



**\$205**  
NWDLI006

## DE-905/N Ethernet Network Kit (5-port Ethernet Hub & 2 ISA-bus Ethernet card)

Network kit for SOHO user, Easy to install, includes two Cat-5, 20 feet cables and AC power adaptor for hub, simple plug-and-play installation, D-link hubby received CeBit 95 Highlight Award.



**\$1690**  
NWDLI014

## DES-1008/N 8-port Ethernet/Fast Ethernet Switch with 8x N-Way UTP ports

8 port UTP Auto negotiating 10/100Mbit switch (N-Way), Supports UTP/STP cables, MDI-II port, Support full/half duplex, Provides cut-through and fast store & forward switching, Auto polarity correction, Dynamic buffer allocation for network load balancing, Desktop size.

Code	Model	Description	Price
NWDLI000	DE-220PCT	ISA Bus PnP Ethernet Adaptor with RJ-45/BNC Connectors	\$35
NWDLI001	DE-528CT	PCI-bus Ethernet adaptor with RJ-45/BNC connectors	\$45
NWDLI004	DE-809TC/N	8-port 10Base-T Ethernet Unmanaged Hub with BNC support	\$159
NWDLI005	DE-816TP/N	16-port 10Base-T Ethernet Unmanaged Hub with 1 AUI & 1 BNC ports (Rack-mount)	\$350
NWDLI011	DES-810	8-port Switch hub, 8x10 BASE-T, 2x100 NWay ports, UTP/STP supported	\$899
NWDLI013	DFE-650TX	Fast Ethernet 10/100MB dual speed NWay PCMCIA card	\$230
NWDLI012	DFE-908X	8 Port 10/100MB dual speed Hub with switching	\$895
NWDLI014	DFE-916X	16 Port 10/100MB dual speed Hub with switching	\$1410
NWDLI015	DP-300	10/100MB dual speed Fast Ethernet Multiprotocol print server	\$530



# NetGear

# NETGEAR

## PRINT SERVER

NETGEAR print servers enable you to connect printers to the network for sharing among multiple PCs.



### PS104 10Mbps Print Server

Ideal for a small network, the PS104 caters for 1 parallel printer. In addition the PS104 sports a built in 4 port ethernet hub to save space and costs.

NWNGR000 **\$369**

### PS110 10/100Mbps Print Server

Perfect for the office environment, the PS110 connects to 2 parallel printers to a 10 or 100 Mbps hub/switch, providing effortless transition from Ethernet to Fast Ethernet. NWNGR001 **\$479**

## 10Mbps Ethernet Hubs

NETGEAR hubs are designed to integrate supreme performance and reliability whilst being easy to use. All hubs are provided with an uplink port for future network expansion capabilities.



CODE	Description	Price
NWNGR005	EN108TP 8 Port Hub with 10Base-T support	\$135
NWNGR002	EN104TP 4 Port Hub with 10Base-T support	\$95
NWNGR003	EN104 4 Port Hub with 10Base-T, AUI and BNC support	\$125
NWNGR004	EN106TP 6 Port Hub with 10Base-T support	\$120
NWNGR006	EN108 8 Port Hub with 10Base-T, AUI and BNC support	\$175
NWNGR007	EN116 16 Port Hub with 10Base-T, AUI and BNC support	\$299
NWNGR012	EN516 16 Port Rack Mountable Hub	\$399
NWNGR013	EN524 24 Port Rack Mountable Hub	\$510

## 10/100 Mbps Dual Speed Hubs

NETGEAR dual speed hubs allows users to mix and match 10 and 100Mbps PCs, servers and peripherals on the same network with ease and without the high cost and complexity of multiple hubs and switches.

### Netgear DS108

The NETGEAR DS108 provides 8 autosensing dual speed ports to connect 8 PC's at 10 or 100 Mbps making network speed upgrades easy and effortless.



Code	Description	Price
NWNGR008	DS508 8 Port Dual speed hub - Stackable	\$1100
NWNGR009	DS516 16 Port Dual speed hub - Stackable	\$1875

## Network Cards



The NETGEAR FA310TX is an autosensing 10/100Mbps Ethernet PCI adapter designed to support the next generation of network applications.

NWNGR010 **\$109**

**LIFE TIME WARRANTY**

The NETGEAR FA410TX is 10/100Mbps PCMCIA Ethernet card. With the FA410TX your laptop is compatible with 10Mbps Ethernet with built in migration to 100Mbps Fast Ethernet; all for a 10Mbps price.

NWNGR011 **\$285**



**TOLL FREE SUPPORT 7 DAY / 24 HOURS with Netgear products**

Bay Networks

Sales staff are available (est) 9am-6pm Monday to Friday, 10am-4pm Saturday  
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RICOH

## CD Writers &amp; Re-Writers

**A single drive that does it all. Reads, writes, Rewrites CD data.**

The Ricoh MP6200 series drives have multi-function capabilities so they can efficiently handle any CD-based media from the world's first re-writable CD, Ricoh's CD-RW, to the write-once CD-R and CD-Rom. With just one drive, you can always choose the perfect media to suit your applications. Now supporting random access writing.

**32X****CD ROM KIT**

- High Speed 32 X MAX
- CD ROM drive, CDRW Read Compatible
- Bonus Webster's World Encyclopedia 1998 Full Version.

**\$145**

MMRIC002

**Ricoh CD-RW**  
Disc 74 Mins  
650Mb

MMRIC003 **\$35**

**Ricoh CD-R**  
Disc 74 Mins  
650Mb

MMRIC004 **\$4**

**Fast writing and reading 6x read  
2x write, CD-RW and CD-R  
writing, unlimited  
media selection**

**MP6200AR  
(EIDE) ATAPI**

Internal EIDE CD-R/CD-RW Drive  
Direct CD Ver. 2.0, Easy CD  
Creator 95/NT, 1 CD-R Disc,  
1 CD-RW Disc Operation Manual,  
Audio Cable, Mounting Screws

**\$650**

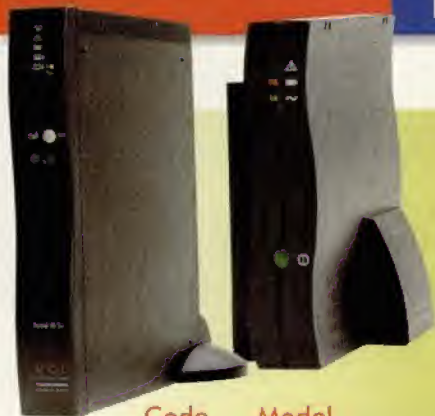
MMRIC001

**MP6200SR (SCSI)**

Internal SCSI CD-R/CD-RW Drive  
Direct CD Ver. 2.0, Easy CD  
Creator 95/NT  
4 CD-R Disc, 1 CD-RW Disc  
Operation Manual, Audio Cable,  
Mounting Screws

**\$695**

MMRIC000

**Protect your Investment****Pulsar EL UPS**

- Entry level solution
- Total protection for your equipment

Code	Model	Price
PSMGE002	EL2+5min backup-time for a PC	<b>\$240</b>
PSMGE003	EL4+20min backup-time for a PC	<b>\$320</b>

**MGE UPS Pulsar Series  
For small businesses**

MGE UPS SYSTEMS is the first UPS manufacturer to design a range of UPS that meet the specific requirements and restrictions of small businesses.

**Pulsar ES+ UPS**

- Total protection for your equipment
- Power protection with backup
- Solution pack software included
- Fax/Modem line filtering

Code	Model	Price
PSMGE000	ES2+5min backup-time for a PC	<b>\$325</b>
PSMGE001	ES5+20min backup-time for a PC	<b>\$410</b>

**Power Filter****Computer and equipment protection!**

- Powercor premium grade AC power filter technology to reduce surge/spike and transient damage.
- Power grid comes with 4 individually wired plugs.

Code	Model	Price
PSGEN004	<b>ZAPTRAP</b> - Multistage filter	<b>\$140</b>
PSGEN005	<b>ZAPCATCHER</b> - Multistage filter with Telecom line surge protection	<b>\$150</b>



**INTERNET WEB SITE:**  
<http://www.adelong.com.au>  
**e.mail:** [info@adelong.com.au](mailto:info@adelong.com.au)

**HEAD OFFICE & SERVICE**  
54 Rosebery Avenue  
Rosebery NSW 2018  
Ph: (02) 9669 3188  
Fax: (02) 9669 3216

**CITY OFFICE**  
127 York Street  
Sydney NSW 2000  
Ph: (02) 9267 5272  
Fax: (02) 9267 5042



# Traxdata

## TRAXDATA



**the biggest CD data-storage brand on the Planet!**

- Easy to use
- Easy to install
- Affordable
- Make your own high quality CDs

Purchase any Traxdata product and you will go into the draw to win the sports car of your dreams or 14 consolation prizes of the latest DVD Players!



### CD-Recordable Driver CDE4120 EL PRO

- 4x/12x **SCSI** Recorder
- WinonCD 3.5 CD Mastering Software (OEM version)
  - Packet CD UDF Recording Software for Win95®
  - 2x Traxdata CD-R Discs & Marker Pen
  - Manuals

MMTRA002 **\$795\*** (Int.)

MMTRA003 **\$895\*** (Ext.)

### Re-Writable Driver CDRW4260 EL PRO

- 4x Record/2x Erase/6x Playback **SCSI** Recorders packed complete with:
- WinonCD 3.5 CD Mastering Software (OEM version)
  - Packet CD UDF Recording Software for Win95®
  - CD Marker Pen
  - Manuals

MMTRA005 **\$895\*** (Int.)

MMTRA017 **\$1045\*** (Ext.)

### Re-Writable Driver CDRW2260 EL PLUS

2x Record/2x Erase/6x Playback **IDE** Recorders packed complete with:

- WinonCD 3.5 CD Mastering Software (OEM version)
- Packet CD UDF Recording Software for Win95®
- Cable
- CD Marker Pen
- Manuals

MMTRA004 **\$625** (Int.)

MMTRA018 **\$795** (Ext. Parallel)

### Re-Writable Driver CDRW2260 EL PRO

2x Record/2x Erase/6x Playback **SCSI** Recorders packed complete with:

- WinonCD 3.5 CD Mastering Software (OEM version)
- Packet CD UDF Recording Software for Win95®
- CD Marker Pen
- Manuals

MMTRA016 **\$699\*** (Int.)



\*add \$100 to include Ultra SCSI Adaptor  
**1.2GB Data Storage Capacity for all recorder kits**

**For PCI Bus**

### SCSI card kit

**\$139**

MMTRA006



### Other Items

Code	Model	Price
MMTRA009	Just Audio	\$85
MMTRA010	CD labelling kit	\$85
MMTRA011	50 Labels multi col.	\$35
MMTRA007	<b>BLANK CD-R</b>	<b>\$3.50</b>
MMTRA008	<b>BLANK CD-RW</b>	<b>\$29</b>
SWTRA007	<b>WinonCD Pro V3.5</b>	<b>\$185</b>

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**Adelony Computers**



## Panasonic

## Monitors

**PanaFlat LC40**

14" colour monitor with state-of-the-art design creating a slim profile.

**SPECIFICATIONS**

- 14" flat screen monitor
- On-Screen display controls
- 0.2775mm dot pitch
- 1024x768 max.res.
- Anti-glare, anti-static coating
- 14" viewable area

**\$2095** MOPAN002

**PanaSync™ S50**

A Valuable Multi-Scan Display With Higher Picture Quality and Convenience.

**SPECIFICATIONS**

- 15" diagonal flat screen
- 1280x1024 max.res.
- 0.27mm dot pitch
- 14" viewable area
- Anti-static, Anti-glare coating

**\$410** MOPAN007

Panasonic's NEW Digital technology sets the standards for Top performing high-end monitors. All monitors feature true-type colours, excellent focus and convergence, power saving functions and crystal clarity in colour display.

**PanaSync P70**

17" Digital Multiscan colour FST display.  
The monitor that's very sharp and compact in size.

**SPECIFICATIONS**

- 17" flat screen monitor
- On-Screen display controls
- 0.25mm dot pitch
- 1600x1200 max.res.
- Advanced anti-glare, anti-static coating
- 16" viewable area

**\$950** MOPAN003

**PanaSync SL70**

17" Digital Multiscan colour FST display.  
The monitor that's very sharp and compact in size.

**SPECIFICATIONS**

- 17" flat screen monitor
- On-Screen display controls
- 0.27mm dot pitch
- 1280x1024 max.res.
- Advanced anti-glare, anti-static coating
- 16" viewable area

**\$795** MOPAN003

**PanaSync S70**

Energy-Saving 17" Display with Automatic frequency selection from 30K - 70kHz.

**SPECIFICATIONS**

- 17" flat screen monitor
- On-Screen display controls
- 0.27mm dot pitch
- 1280x1024 max.res.
- Anti-glare, anti-static coating
- 16" viewable area

**\$755** MOPAN004

**PanaSync/ProP110**

21" monitor utilising Digital technology demonstrating enhanced imagery and colour sharpness.

**SPECIFICATIONS**

- 21" flat screen monitor
- On-Screen display controls
- 0.25mm dot pitch
- Anti-glare, anti-static coating
- 1800x1440 max.res.
- 20" viewable area

**\$2675** MOPAN000

**PanaSync S110**

The 21" monitor that takes brightness to a new level and places its focus on high image quality.

**SPECIFICATIONS**

- 21" flat screen monitor
- On-Screen display controls
- 0.25mm dot pitch
- 1600x1200 max.res.
- Anti-glare, anti-static coating
- 20" viewable area

**\$2149** MOPAN001

## Panasonic

## Drives

**LS 120 120MB LKM-F434-1**

- Lge storage cap. of 120MB in a single LS-120 diskette
- 100% compat. with existing 3.5" diskette media
- Supported by MS DOS, Windows (3X, 95, NT)
- 5 x faster than stand. 1.44MB drives-using LOS-120 disk.
- Boot., can act as a Boot Drive when approp. BIOS inst.



BUPAN000 **\$175**

**ZIP Drive JU-811T01**

- 100Mb Capacity (70 FDDs)
- Able to transmit image files, desktop publishing, music files and video clips
- Data transfer rate: Sustained up to 11.2 Mbits/Sec, Burst Up to 26.7 Mbits/sec
- Comes with free software Toolbox for Zip



BUPAN001 **\$165**

**New Drives using state-of-the-art technology for high capacity data storage**

**CD Recordable (4Wx8R) CW-7502-BAB**

CD-Recordable Drive Kit, 4-speed write/8-speed read bundles with software & SCSI interface



MMPAN003 **\$735** (KIT)  
MMPAN004 **\$570** (BARE DRIVE)

**CD ROM 32X CR-588-B**

Panasonic CD-Rom Drive with an excellent reputation for reliability for performance. Superfast 32x speed reading, this can also read CDRW disc.



MMPAN002 **\$125**

**CD ROM SCSI 24X CR-508-BPA**

Panasonic CD5088 SCSI 2 CD-Rom drive is one of the best performing drives available. Super fast access time of 85ms and 3600KB/s sustained transfer rate.



MMPAN001 **\$175**



# Monitors



EXCELLENCE THROUGH INNOVATION



Adelong Computers



**Mitsubishi  
Diamond View  
1554 15"**  
**\$355**  
MOMIT003

Advanced Plug & Play

Superior image  
fidelity 0.28DP

Maximum Resolution  
1024x768 up to 66Hz

13.6" True viewable



**Mitsubishi  
Diamond View  
1772E 17"**  
**\$695**  
MOMIT002

Advanced PnP compatibility

Superior image  
fidelity 0.27DP

Freq H: 30-72KHz  
Freq V: 50-120Hz

Maximum Resolution:  
1280x1024 up to 60Hz

16.0" True Viewable



**Mitsubishi  
Diamond Plus  
71 17"**  
**\$995**  
MOMIT001

DIAMONDTRON Monitor,  
with the super-fine aperture  
grille pitch of 0.25mm

Maximum Resolution  
1280x1024 up to 65Hz

16.0" True viewable



**Mitsubishi  
Diamond Pro  
91TXM 21"**  
**\$3195**  
MOMIT000

A new DIAMONDTRON Monitor,  
with the super-fine aperture grille  
pitch of 0.28mm

Maximum Resolution  
1280x1024

19.7" True viewable

new

**Mitsubishi  
15" LCD TFT**  
**\$3750**  
MOMIT004

15" LCD TFT Monitor with  
the grille pitch of 0.28mm

Maximum Resolution  
1024x768



## Storage

The new standard  
in diskette storage.

Code Model  
BUMIT000 Mitsubishi LS - 120 - 120MB Capacity.  
Mitsubishi LS-120 FACTS:

- Large storage capacity of 120MB in a single LS-120 diskette.
- 100% compatibility with existing 3.5" diskette media
- Supported by MS DOS, Windows (3X, 95, NT)
- Bootable, can act as a Boot Drive when appropriate BIOS installed

BUMIT001 120MB capacity diskettes to suit LS - 120 Drive **\$25**

Code	Model	Price
FDMIT000	Mitsubishi Diamond Data 1.44MB Floppy disk drive.	<b>\$36</b>
MMMIT002	6x2 CD Rewriter 6206D IDE KIT + SW + CD	<b>\$650</b>
FMMIT000	Diamond Voice V.90 56K Internal Modem	<b>\$140</b>
FMMIT001	Diamond Voice V.90 56K External Modem	<b>\$150</b>

Code	Model	Price
	• E-IDE/ATAPI interface.	
	• 3600KB/sec maximum data transfer rate (24x max)	
	• 125ms typical access time	

MMMIT001 Diamond Data 32X CD-ROM **\$118**



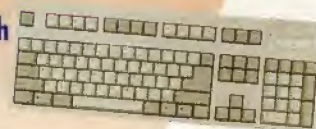
Price  
**\$180**

## Keyboards

**Mitsubishi Diamond Touch  
Ergonomic Keyboard**  
**\$49** IOMIT001



**Mitsubishi Diamond Touch  
Economical Keyboard**  
**\$30** IOMIT000



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**DAEWOO****Monitors**

Featuring the latest technology, Daewoo introduces a new range of sophisticated colour monitors that brings life to the screen. Daewoo is the 'One to Watch'.

**MODEL CMC-431X**  
**14" XGA Colour Monitor**

- SPECIFICATIONS**
- 14"/0.28mm dot pitch
  - Non-glare face
  - 65 MHz bandwidth
  - Digital controls
  - 80 Watt consumption
  - DDC compatibility
  - Energy saving
  - 250 x 187mm display
  - Low radiation
  - Safe & Ergonomical
  - Flicker-free display
  - Display power management

**\$275**  
MODAE000

**MODEL 518B**  
**15" Colour Monitor**

**\$375**  
MODAE001

- SPECIFICATIONS**
- 15"/0.28mm dot pitch
  - Non-glare face, Anti-static
  - 85 MHz bandwidth
  - On-screen digital controls
  - 75 Watt consumption
  - DDC compatibility
  - Energy saving
  - 265 x 198mm display
  - Low radiation
  - Safe & Ergonomical
  - Flicker-free display
  - Display power management

**MODEL CMC-1705B**  
**17" Multimedia Colour Monitor**

**\$799**  
MODAE003

- SPECIFICATIONS**
- 17"/0.28mm dot pitch
  - Non-glare face, Anti-static
  - 85 MHz bandwidth
  - On-screen digital controls
  - 90 Watt consumption
  - DDC compatibility
  - Energy saving
  - 310 x 233mm display area
  - Low radiation
  - Safe & Ergonomical
  - Flicker-free display
  - Display power management

**MODEL CMC-1509B**  
**15" Multimedia Colour Monitor**

**\$435**  
MODAE002

- SPECIFICATIONS**
- 15"/0.28mm dot pitch
  - Non-glare face, Anti-static
  - 85 MHz bandwidth
  - On-screen digital controls
  - 90 Watt consumption
  - DDC compatibility
  - Energy saving
  - 270 x 203mm display area
  - Low radiation
  - Safe & Ergonomical
  - Flicker-free display
  - Display power management

**MODEL CMC-1707B**  
**17" Multi Scan Colour Monitor**

**\$695**  
MODAE004

- SPECIFICATIONS**
- 17"/0.28mm dot pitch
  - Non-glare face, Anti-static
  - 85 MHz bandwidth
  - On-screen digital controls
  - 120 Watt consumption
  - DDC compatibility
  - Energy saving
  - 300 x 225mm display area
  - Low radiation
  - Safe & Ergonomical
  - Flicker-free display
  - Display power management

**KTX®****KTX****CD-R DRIVE 822**

IDE INTERFACE  
CD-R SOFTWARE  
BLANK CD-R

**8 X READ**  
**2 X WRITE SPEED**

**\$545**  
MMKTX001

STORE  
CREATE  
RECORD  
BACKUP  
MERGE

**HOT! HOT! HOT!**  
**56K VOICE FAX  
MODEM**

K56 - Flex  
V.90 upgradeable

**\$129**  
FMKTX001

Speakerphone  
function

**35 Hours  
FREE!**  
Internet Access\*

**SCANNER 9600UP**  
**PARALLEL PORT INTERFACE**

- 36-BIT COLOUR
- 9600 DPI
- SOFTWARE INCLUDE



**\$255**  
BKTX001



Yamaha  
PCI Sound  
Card

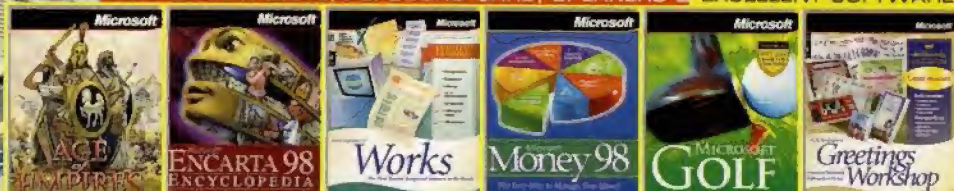
**32X SPEED  
CD-ROM!**

**\$245**  
MMKTX000

Includes the  
#1 selling  
Age of Empires

**WORK & PLAY 98**  
**MEGA MULTIMEDIA PACK**

32 x CD-ROM DRIVE, PCI SOUND CARD, SPEAKERS & EXCELLENT SOFTWARE



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Software retail box photographs are used for illustration only - OEM product is supplied (in plain packaging). Box shots reprinted with permission from Microsoft Corporation.



# Monitors



## CTX

The EZPro 500 projector is great for presentations, multimedia and home theatre. Light in weight, these units are portable and very affordable in price.

**\$3650** MMCTX000

**THREE YEAR on-site warranty!**



**Hansol 701A**

Full featured professionals 17" (15.7 viewable), full square high resolution flat face colour monitor with 0.28 dot pitch.

### Specifications:

- Easy to use
- Fully supports Windows 95
- Resolution of 1280 x 1024 at 60Hz(N/I)
- Bandwidth (-3dB) 110MHz
- Microprocessor
- Plug & Play
- Display area of 320 x 240mm
- User control with Power Switch, Reset, Manual Degaussing, Contrast & Brightness
- Power saving (DPMS)
- Standard EMI, Safety, Ergonomics & low rad.

**\$675** MOHAN004



**AWARD WINNING MONITOR**



**Hansol 700P**

Full featured professionals 17" (15.7 viewable), full square high resolution flat face colour monitor with 0.26 dot pitch.

### Specifications:

- Easy to use
- Fully supports Windows 95
- Resolution of 1600 x 1200 at 66.6Hz(N/I)
- Bandwidth (-3dB) 135MHz
- Microprocessor
- Plug & Play
- Display area of 320 x 240mm
- User control with Power Switch, Reset, Manual Degaussing, Contrast & Brightness, H/V size, Tilt, Colour control
- Power saving (DPMS)
- Standard EMI, Safety, Ergonomics & low rad.

**\$795** MOHAN005



**Hansol 401A**

14" Diagonal colour monitor also available - 280 x 210mm with 0.28 dot pitch.

### Specifications:

- Resolution of 1024x768 at 60Hz(N/I)
- Bandwidth (-3dB) 65MHz
- Microprocessor
- Plug & Play
- Display area of 274x206mm
- Standard EMI, Safety, Ergonomics and low radiation.

**\$255** MOHAN000



**Hansol 500A**

15" Diagonal colour monitor 280 x 210mm with 0.28 dot pitch.

### Specifications:

- Easy to use
- Fully supports Windows 95
- Display area of 280 x 210mm
- Ergonomics and low radiation
- Resolution of 1024 x 768-60Hz
- Standard EMI, Safety, Bandwidth 65MHz
- Universal Power
- Microprocessor
- Microprocessor
- Plug & Play

**\$355** MOHAN001



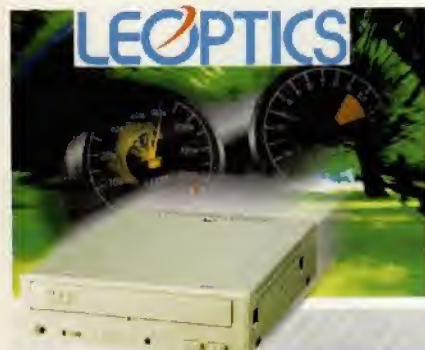
**Hansol 500M**

15" Diagonal colour monitor 280 x 210mm with 0.28 dot pitch.

### Specifications:

- Easy to use
- Fully supports Windows 95
- Display area of 280 x 210mm
- Ergonomics and low radiation
- Resolution of 1024 x 768-60Hz
- Standard EMI, Safety, Bandwidth 65MHz
- Universal Power
- Microprocessor
- Microprocessor
- Plug & Play

**\$3750** MOHAN003



**LEOPTICS**

### 32X CD-ROM Drive

- Intelligent latest advanced technology
- Has a good suspension for vibration control
- Front panel with a direct Audio CD play function button
- High data transfer rate-- 4800 KB/Sec.
- Data access speed is powerful-- 100 msec.

**\$100** MMLEO001

### CD-Recordable/Re-Writable Multi-function Disc Drive

- Unique multi-function concept combining 6x CD-ROM reader, 2x CD-Rewritable drive
- IDE/ATAPI interface - no need for costly SCSI adaptors
- Supports TAO (Track At Once), DAO (Disc At Once), MS (Multi-Session), fixed and variable (Incremental Packet) writing modes, as well as CD-DA, CD-ROM (XA), CD-Bridge, Multi-Session, CD-I, Video-CD and CD-UDF disc formats

**\$690** MMLEO002

Sales staff are available (est) 9am-6pm Monday to Friday, 10am-4pm Saturday  
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### CPU Switch

#### CS-102/104/106/128

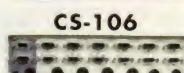
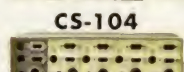
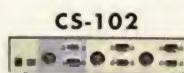
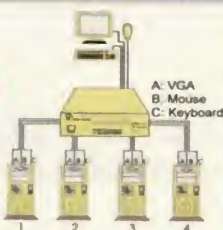
These CPU switches are useful for operating 2 to 8 computers from one keyboard, mouse and monitor. Ideal for administrators & those with more than 1 computer. Switching is done via an electronic button.

Code	Model	Price
DSADE030	<b>CS-102</b>	<b>\$245</b>
	2-port CPU Switch with AT mouse and keyboard support	

Code	Model	Price
DSADE037	<b>CS-122</b>	<b>\$275</b>
	Same as 102 with PS/2 support	

Code	Model	Price
DSADE019	<b>CS-104</b>	<b>\$395</b>
	4-port CPU Switch with PS/2 AT mouse and keyboard support	

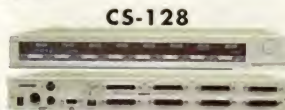
Code	Model	Price
DSADE020	<b>CS-106</b>	<b>\$399</b>
	6-port CPU Switch with AT mouse and keyboard support	



Code	Model	Price
CBGEN098	AT Cable Set	<b>\$35</b>
	(KeyBd M/M, Mouse M/F & Monitor M/F)	

Code	Model	Price
CBGEN099*	PS/2 Cable Set	<b>\$39</b>
	(KeyBd M/M, Mouse M/M & Monitor 5M/15F)	

Code	Model	Price
DSADE036	<b>CS-128</b>	<b>\$695</b>
	8-port CPU Switch with both PS/2 and AT mouse/keyboard support	
	*Requires special cables	



Code	Model	Price
CBGEN127	AT Cable for CS-128	<b>\$39</b>

Code	Model	Price
CBGEN128	PS/2 Cable for CS-128	<b>\$39</b>

## Data Switches

### Video Splitter

#### VS-102/104/108

These video splitters are the ideal solution for image duplication. Cascade ability allows infinite no. of VGA monitors to display the same image.

Cable Required; 15pin M/15pin F

**VS-102****VS-104****VS-108**

Code	Model	Price
DSADE000	<b>VS-102</b>	<b>\$95</b>
	2-port Video Splitter	

Code	Model	Price
DSADE001	<b>VS-104</b>	<b>\$135</b>
	4-port Video Splitter	

Code	Model	Price
DSADE002	<b>VS-108</b>	<b>\$195</b>
	8-port Video Splitter	

### Printer Switch

Printer switch. 1 computer to connect to multiple printers.

Code	Model	Price
DSADE007	<b>4 Way Printer Switch</b>	<b>\$39</b>
DSADE021	<b>2 Way Printer Switch</b>	<b>\$25</b>



### Manual CPU Switch

Code	Model	Price
DSADE028	2 to 1 Manual CPU Switch	<b>\$29</b>



Code	Model	Price
DSADE029	4 to 1 Manual CPU Switch	<b>\$39</b>



## Cables

### PRINTER CABLES

Item Code	Description	Price
CB-GEN000	1.8M PRINTER CABLE	<b>\$5.00</b>
CB-GEN002	5 METERS PRINTER CABLE	<b>\$12.00</b>
CB-GEN003	10 METERS PRINTER CABLE	<b>\$19.00</b>
CB-GEN089	1.8M IEEE1284 PRINTER CABLE	<b>\$20.00</b>

### DB25 CABLES

Item Code	Description	Price
CB-GEN008	1.8M SERIAL DB25M/DB25M	<b>\$9.00</b>
CB-GEN010	5M SERIAL DB25M/DB25M	<b>\$17.00</b>
CB-GEN011	10M SERIAL DB25M/DB25M	<b>\$20.00</b>
CB-GEN013	1.8M SERIAL DB25M/DB25F	<b>\$9.00</b>
CB-GEN015	5M SERIAL DB25M/DB25F	<b>\$15.00</b>
CB-GEN016	10M SERIAL DB25M/DB25F	<b>\$17.00</b>
CB-GEN018	1.8M DB25F/DB25F	<b>\$9.00</b>
CB-GEN021	10M SERIAL DB25F/DB25F	<b>\$17.00</b>
CB-GEN021	10M SERIAL DB25F/DB25F	<b>\$20.00</b>

### KEYBOARD & VGA CABLES

Item Code	Description	Price
CB-GEN023	1.8M KEYBOARD EXT M/F	<b>\$9.00</b>
CB-GEN025	5M KEYBOARD EXT M/F	<b>\$15.00</b>
CB-GEN026	1.8M CURLY KB EXT M/F	<b>\$10.00</b>
CB-GEN027	1.8M PS/2 KB EXT M/F	<b>\$12.00</b>
CB-GEN028	1.8M PS/2 KEYBOARD M/M	<b>\$12.00</b>
CB-GEN029	1.8M KEYBOARD CABLE M/M	<b>\$10.00</b>
CB-GEN030	1.8M EGA/MOUSE EXT 9F/9M	<b>\$9.00</b>
CB-GEN031	1.8M EGA/MOUSE 9M/9M	<b>\$9.00</b>
CB-GEN032	1.8M VGA EXT 15M/15F	<b>\$9.00</b>
CB-GEN036	MONITOR SPLITTER 15M/15F*2	<b>\$15.00</b>
CB-GEN037	1.8M RGB CABLE 15M/BNC*5	<b>\$25.00</b>

### SCSI PRODUCTS

Item Code	Description	Price
CB-GEN042	1M CENT50M TO CENT50M SCSI	<b>\$15.00</b>
CB-GEN043	1.8M CENT 50M CENT 50M SCSI	<b>\$17.00</b>
CB-GEN044	1M CENT 50M/DB25M SCSI	<b>\$15.00</b>
CB-GEN045	CENT 50M SCSI TERM ACTIVE	<b>\$25.00</b>
CB-GEN046	CENT 50M TERM/CSOM/CSOF	<b>\$19.00</b>
CB-GEN047	1M HONDA 50M/CENT 50M	<b>\$25.00</b>
CB-GEN048	1.8M HONDA50M/CENT50M	<b>\$29.00</b>
CB-GEN049	1M HONDA 50M/DB25 SCSI II	<b>\$25.00</b>
CB-GEN050	1M HONDA 50M/HONDA 50M	<b>\$39.00</b>
CB-GEN051	1M HONDA 68M/HONDA 68M	<b>\$45.00</b>
CB-GEN052	1M HONDA 68M/HON 50M	<b>\$45.00</b>
CB-GEN053	1M HONDA 68M/CENT 50M	<b>\$25.00</b>
CB-GEN054	HONDA 50M TERMINATOR ACT	<b>\$25.00</b>
CB-GEN055	HONDA 68M TERMINATOR ACT	<b>\$39.00</b>
CB-GEN056	INTERNAL TERMINATOR ACT	<b>\$20.00</b>
CB-GEN057	INTERNAL SCSI III	<b>\$85.00</b>
CB-GEN060	INT SCSI CABLE 7 CONNECT	<b>\$15.00</b>
CB-GEN083	HONDA 68 TO DB25 M SCSI III	<b>\$45.00</b>

### NETWORKING

Item Code	Description	Price
CB-GEN065	5M COAXIAL CABLE WITH BNC	<b>\$12.00</b>
CB-GEN066	10M COAXIAL CABLE WITH BNC	<b>\$15.00</b>
CB-GEN067	20M COAXIAL CABLE WITH BNC	<b>\$20.00</b>
CB-GEN070	BNC TERMINATOR	<b>\$3.50</b>
CB-GEN071	BNC T CONNECTOR	<b>\$3.50</b>
CB-GEN073	2M RJ45 CABLE	<b>\$10.00</b>
CB-GEN074	5M RJ45 CABLE	<b>\$15.00</b>
CB-GEN076	10M RJ45 CABLE	<b>\$20.00</b>

Item Code	Description	Price
CB-GEN077	15M RJ45 CABLE	<b>\$25.00</b>
CB-GEN078	20M RJ45 CABLE	<b>\$30.00</b>
CB-GEN080	30M RJ45 CABLE	<b>\$45.00</b>
CB-GEN081	40M RJ45 CABLE	<b>\$59.00</b>
CB-GEN084	2 METRE RJ45 CABLE-CROSS	<b>\$12.00</b>
CB-GEN087	10 METRE RJ45 CABLE-CROSS	<b>\$25.00</b>

### SCSI ADAPTERS

Item Code	Description	Price
CB-GEN131	HONDA50F/CENT50M	<b>\$30.00</b>
CB-GEN132	HONDA50M/CENT50F	<b>\$25.00</b>
CB-GEN133	HONDA50F/CENT50F	<b>\$32.00</b>
CB-GEN134	HONDA50F/DB25M	<b>\$25.00</b>
CB-GEN135	GENDER CHANGER CEN50 F/F	<b>\$12.00</b>
CB-GEN136	HONDA68M/CEN50F	<b>\$35.00</b>
CB-GEN137	HONDA68F/CEN50M	<b>\$38.00</b>
CB-GEN138	HONDA68M/HONDA50F	<b>\$39.00</b>
CB-GEN139	HONDA68F/HONDA50F	<b>\$40.00</b>
CB-GEN140	HONDA68M/HONDA68F	<b>\$45.00</b>
CB-GEN141	HONDA68F/HONDA68F	<b>\$45.00</b>
CB-GEN142	INT. SCSI 50F/68F	<b>\$20.00</b>
CB-GEN143	INT. SCSI 50F/68M	<b>\$20.00</b>
CB-GEN144	INT. SCSI 50M/68F	<b>\$20.00</b>
CB-GEN145	INT. SCSI 50M/68M	<b>\$20.00</b>
CB-GEN146	INT. SCSI 50M/50F BRACKET ADAPTER	<b>\$20.00</b>
CB-GEN147	INT. SCSI 50M/68F BRACKET ADAPTER	<b>\$25.00</b>
CB-GEN148	INT. SCSI 50M/DB25 BRACKET ADAPTER	<b>\$20.00</b>
CB-GEN149	INT. SCSI 50F/68F	<b>\$30.00</b>
CB-GEN150	INT. SCSI 68F/68F BRACKET ADAPTER	<b>\$35.00</b>

Call for more cable information



# Scanners / Input Devices



## Keyboards

Code	Model
IOGEN000	ENHANCED 104/WIN95
IOGEN001	HONEYWELL GENUINE - 104/WIN95
IOGEN010	GENERIC PS/2 Keyboard

## Mice

IOGEN004	GENERIC 3 BUTTON MOUSE	\$10
IOMST003	MICROSOFT INTELLI-MOUSE	\$90
IOMST004	GENIUS 3 BUTTON MOUSE - SER./PS2	\$25

## Acerscan

IOACE000	ACERSCAN 310 24 BIT-4800dpi	\$198
IOACE004	ACERSCAN 610 PLUS 30 BIT-9600dpi	\$310



## Scanners

<b>Hewlett Packard 5100</b>	IOHPD01	<b>\$465</b>
• 1200x1200dpi, 300dpi, 24-bit colour, 8-bit grayscale. • Incl. Visioneer PaperPort V3.0 software.		



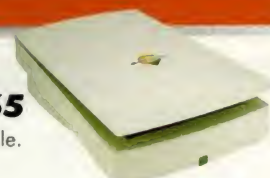
Code	Model	Price
IOHPD012	5100 with Adobe Photoshop 4.0	\$655
IOHPD013	5100 with Omnipage Pro	\$695

## Hewlett Packard 6100C

IOHPD011

**\$1169**

- 2400x2400dpi, 600dpi, 30-bit colour, 10-bit grayscale.
- 35mm HP ScanJet Slide Adaptor.
- Incl. DeskScan II scanning software, or from within software using TWAIN or OLE.



# Cases & Power Supplies

## ADE Generic Cases

Code	Model	Dimensions (W x D x H)	Price
CAADE000	ADE MINITOWER CASE	180mm x 415mm x 332mm	\$50
CAADE001	ADE DESKTOP CASE	491mm x 401mm x 147mm	\$50
CAADE002	ADE MIDITOWER CASE	180mm x 405mm x 380mm	\$75
CAADE011	ADE FULL TOWER ATX 300W	192mm x 427mm x 580mm	\$225

## Miscellaneous Cases

Code	Model	Dimensions (W x D x H)	Price
CAADE007	Ext. HDD SCSI Case	216mm x 81mm x 63mm	\$175
CAADE008	Ext. 5.25" IDE CD-ROM Case	203mm x 256mm x 74mm	\$159
DSADE024	EH-132, Portable 3.5" HD caddy which plugs straight into the parallel port of your computer. 40MB - 8.4GB limit.		\$165
DSADE025	EH-100, Portable 3.5" / 2.5" HD caddy which plugs straight into the parallel port of your computer. 40MB - 8.4GB limit.		\$145

\*ALL Cases include Power Supplies

## Power Supplies



Code	Model	Price
PSGEN000	200W POWER SUPPLY	\$35
PSGEN001	300W POWER SUPPLY	\$99
PSGEN002	200W ATX POWER	\$55
PSGEN003	300W ATX POWER	\$99

## UPS Power Supplies



Code	Model	Price
PSAPC000	APC BACK-UPS 500	\$325
PSAPC001	APC BACK-UPS PRO 420	\$415
PSAPC002	APC BACK-UPS PRO 650	\$595
PSAPC003	APC SMART-UPS 700	\$845

## ADE FILE SERVER CASE AT/ATX

- 2 x 300W Redundant Power Supplies
- 7 x 5 1/4" & 2 x 3 1/2" Bays

CAADE013 **\$975**



## ADE DELUXE AT/ATX MID CASE

- W: 192mm
- D: 430mm
- H: 540mm

CAADE004 **\$155**



## ADE DELUXE AT/ATX MID CASE

- W: 190mm
- D: 425mm
- H: 475mm

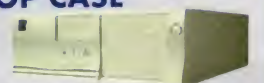
CAADE009 **\$135**



## ADE DELUXE AT/ATX DESKTOP CASE

- W: 442mm
- D: 473mm
- H: 155mm

CAADE012 **\$135**



# Backups & Media

## Backup Devices

### SONY 3.5" DAT SCSI DRIVES

Code	Model	Price
BUSON000	SONY SDT4000 2/4GB INT DDS-1	\$1198
BUSON001	SONY SDT5000 4/8GB INT DDS-2	\$1375
BUSON003	SONY SDT5000 4/8GB EXT DDS-2	\$1650

## Media

BUGEN008	4MM DAT DDS-2 120M 4GB/8GB COMP	\$25
BUGEN009	4MM DAT DDS-3 125M 12GB/24GB COMP	\$65

## Media

Code	Model	Price
BUGEN000	QIC80 DC2120 120MB/250MB COMP	\$39
BUGEN001	QIC-3020 MC300XL 680MB/1.36GB COMP	\$45
BUGEN002	QIC-WIDE 520 200MB/400MB COMP	\$45
BUGEN003	TRAVAN TR-1 400MB/800MB COMP	\$45
BUGEN004	TRAVAN TR-2 800MB/1.6GB COMP	\$45
BUGEN005	TRAVAN TR-3 1.6GB/3.2GB COMP	\$59
BUGEN006	TRAVAN TR-4 4GB/8GB COMP	\$69
BUGEN007	4MM DAT DDS-1 90M 2GB/4GB COMP	\$15

Sales staff are available (est) 9am-6pm Monday to Friday, 10am-4pm Saturday  
Technical Support (5 Days a week 9am-6pm) Phone (02) 9700 9354



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hp HEWLETT  
PACKARD EPSON

## Printers

## HP 695C

Inexpensive and simple to use, the HP DeskJet 695C printer produces affordable, high-quality colour and black printing - perfect for schoolwork, personal finances, letters and hobbies.

**\$345**

PRHPD039



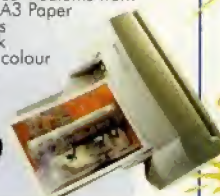
## HP 1120C

• **600dpi C-Net & Colour Smart II**

- Print on various mediums from Post Card to A3 Paper
- 3 paper paths
- 6.5ppm black and 3.5ppm colour
- Optional HP JetDirect for Network Connection

**\$950**

PRHPD032



## HP 720C

- PhotoREt II delivers **smaller ink drops & more colour shades**
- The HP DeskJet 720C is designed for Microsoft® Windows® 3.1x, Windows 95 and Windows® NT 4.0 OS & supports Intel's MMX technology for faster colour processing
- Prints fast - up to 8 pages per minute

**\$575**

PRHPD031



## HP 6L

- **Compact size**
- 600dpi RET
- Up to 6ppm makes the HP 6L the ideal printer for the home or small office

**\$660**

PRHPD009

**\$409**

PREPS002

## STYLUS COL. 600

1440X720 DPI, 3PPM, WIN COMP. With its remarkable 1440 x 720 dpi capability, the Epson Stylus COLOR 600 sets a new standard for cost-efficient, photo-quality colour printing without the need for expensive options.

**\$545**

PREPS003

## STYLUS COL. 800

1440X720 DPI, 7PPM The new Epson Stylus COLOR 800 is targeted at business/corporate and professional graphics users. It includes speeds which eclipse many desktop laser printers as well as an amazing photo-quality resolution of 1440 by 720 dpi.

**\$845**

PREPS015

## STYLUS PHOTO EX.

The Epson Stylus Photo EX is the perfect printer for photo reproduction, pre-proof graphics. Industry-leading 1440dpi resolution with a six-colour ink system and A3 paper handling.



Code	Model	Price
PRHPD010	LaserJet 6P	<b>\$1399</b>
PRHPD000	DeskJet 340	<b>\$495</b>
PRHPD002	DeskJet 670C	<b>\$255</b>
PRHPD034	LaserJet 3100	<b>\$1395</b>
PRHPD035	OfficeJet Pro 1170C	<b>\$1450</b>
PRHPD025	DeskJet 890C	<b>\$1425</b>
PRHPD039	DeskJet 695C	<b>\$345</b>

Code	Model	Price
PREPS001	Stylus Col. 400	<b>\$299</b>
PREPS010	Stylus Col. 1520	<b>\$1595</b>
PREPS016	Stylus Col. 850	<b>\$745</b>
PREPS011	Stylus Photo 700	<b>\$509</b>

## Ink &amp; Toner Cartridges

## Canon

Code	Description	Printer compatibility	Price
INCAN000	BC01 BLACK	BJ10/20	<b>\$45</b>
INCAN001	BC02 BLACK	BJ200/BJ210/BJ240	<b>\$45</b>
INCAN002	BC05 COLOUR	BJ210/240	<b>\$49</b>
INCAN003	BC06 PHOTO COLOUR	BJ240	<b>\$49</b>
INCAN004	BC06 PHOTO COLOUR KIT	BJ240	<b>\$65</b>
INCAN005	BC09F FLURO COLOUR	BJ210/BJ240	<b>\$79</b>
INCAN006	BC10 BLACK & HEAD	BJ30/BJ70	<b>\$55</b>
INCAN007	BC1-10 BLACK	BJ70	<b>\$25</b>
INCAN008	BC11 COLOUR & HEAD	BJ70	<b>\$65</b>
INCAN009	BC1-11 BLACK (3 PK)	BJ70	<b>\$25</b>
INCAN010	BC1-11C COLOUR (3 PK)	BJ70	<b>\$35</b>
INCAN011	BC20 BLACK & HEAD	BJ4000 SERIES	<b>\$49</b>
INCAN012	BC21 COLOUR & BLACK	BJ4000 SERIES	<b>\$79</b>
INCAN013	BC121 BLACK	BJ4000 SERIES	<b>\$14</b>
INCAN014	BC121C TRI-COLOUR	BJ4000 SERIES	<b>\$29</b>
INCAN015	BC22 PHOTO	BJ4200/BJ4500	<b>\$75</b>
INCAN016	BC22 PHOTO KIT	BJ4200/BJ4500	<b>\$95</b>
INCAN017	BC29F FLURO COLOUR	BJ4000 SERIES	<b>\$75</b>
INCAN018	BJI201B BLACK	BJ600 SERIES	<b>\$25</b>
INCAN019	BJI201C CYAN	BJ600 SERIES	<b>\$15.50</b>
INCAN020	BJI201M MAGENTA	BJ600 SERIES	<b>\$15.50</b>
INCAN021	BJI201Y YELLOW	BJ600 SERIES	<b>\$15.50</b>
INCAN022	BJI642 BLACK	BJ300/330	<b>\$29</b>
INCAN023	BJI643 BLACK	BJ800/880	<b>\$45</b>
INCAN024	BJI643C CYAN	BJ800/880	<b>\$49</b>
INCAN025	BJI643M MAGENTA	BJ800/880	<b>\$49</b>
INCAN026	BJI643Y YELLOW	BJ800/880	<b>\$49</b>
INCAN027	BJI801 BLACK	BJ80	<b>\$39</b>
INCAN028	BC03 BLACK	BJ210SP	<b>\$45</b>
INCAN029	BC60 BLACK	BJC7000	<b>\$59</b>
INCAN030	BC61 COLOUR	BJC7000	<b>\$69</b>
INCAN031	BC62 PHOTO COLOUR	BJC7000	<b>\$95</b>

hp HEWLETT  
PACKARD

Code	Description	Printer compatibility	Price
INHDP000	HP51633M BLACK	HP PORTABLE	<b>\$49</b>
INHDP001	HP51626A BLACK	HP 500 SERIES	<b>\$49</b>
INHDP002	HP51629A BLACK	HP 600 SERIES	<b>\$55</b>
INHDP003	HP51645A BLACK	HP850C/1600	<b>\$50</b>
INHDP004	HP51640A BLACK	DJ 1200 SERIES	<b>\$55</b>
INHDP005	HP51606A BLACK	HP PAINTJET XL	<b>\$55</b>
INHDP006	HP51639A BLACK	PAINTJET XL300	<b>\$55</b>
INHDP007	HP51625A COLOUR	DJ500 SERIES	<b>\$55</b>
INHDP008	HP51649A COLOUR	HP 600 SERIES	<b>\$55</b>
INHDP009	HP51641A COLOUR	HP850C	<b>\$55</b>
INHDP010	HP51640C CYAN	DJ1200/1600	<b>\$55</b>
INHDP011	HP51640M MAGENTA	DJ1200/1600	<b>\$55</b>
INHDP012	HP51640Y YELLOW	DJ1200/1600	<b>\$55</b>
INHDP013	HP COLOUR PHOTO KIT	HP690C	<b>\$79</b>
INHDP014	HP 16A PHOTO INK	HP690/692/693	<b>\$59</b>
INHDP022	HP1823A COLOUR	HP720/890/1120	<b>\$59</b>

## EPSON

Code	Description	Printer compatibility	Price
INEPS003	SO20025 BLACK	400/800/1000	<b>\$35</b>
INEPS004	SO20034 BLACK	COLOUR/PRO/PROXL	<b>\$45</b>
INEPS005	SO20036 COLOUR	COLOUR/PRO/PROXL	<b>\$85</b>
INEPS006	SO20047 BLACK	200/820/1111S	<b>\$35</b>
INEPS007	SO20049 COLOUR	1111S/820/1500	<b>\$45</b>
INEPS008	SO20062 BLACK	STYLUS 1500	<b>\$65</b>
INEPS009	SO20066 COLOUR	STYLUS PRO XL+	<b>\$95</b>
INEPS010	SO20089 COLOUR	400/600/800/1520	<b>\$45</b>
INEPS011	SO20093 BLACK	C400/500/600	<b>\$35</b>
INEPS012	SO20097 COLOUR	C500/200	<b>\$49</b>
INEPS013	SO20108 BLACK	C800/1520	<b>\$45</b>
INEPS014	SO20110 PHOTOCOLOUR	PHOTO 700/EX	<b>\$45</b>

## Toner Cartridge

Code	Description	Printer compatibility	Price
TOHPD000	HP92295A	HP LASERJET II/III	<b>\$135</b>
TOHPD001	HP92274A	HP 4L/4ML/4P/4MP	<b>\$125</b>
TOHPD002	HP-C3906A	HP LASERJET 5L/6L	<b>\$105</b>
TOHPD003	HP92275A	HP IIP/IIIP/IIIP+	<b>\$149</b>
TOHPD004	HP92291A	HP 45I/45I MX/35I	<b>\$220</b>
TOHPD005	HP-C3900A	HP 55I/55I MX	<b>\$325</b>
TOHPD006	HP92298Z	HP 4/4M/5/5N/5M	<b>\$165</b>
TOHPD007	HP-C3900A	HP 4V/4MV	<b>\$275</b>
TOHPD008	HP	HP 5P/5MP/6P/6MP	<b>\$145</b>



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SWMST069	Windows 98 Upgrade CD	\$138
SWMST071	Microsoft Plus 98	\$65



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Norton Anti-Virus,  
Microsoft Intellimouse



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SWMST005	Microsoft Office Standard Edition	\$755
SWMST006	Microsoft Office Standard Edition Upgr.	\$419

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SWADD000	Adobe PageMaker 6.5	\$1075
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SWADD006	Adobe Photoshop 5.0	\$1095
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Code	Description	Price
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## pcANYWHERE

Code	Description	Price
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SWSYM014	Norton Uninstall	\$59

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Code	Description	Price
SWMST020	Microsoft FrontPage 98	\$175
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- Microsoft Money 98 • Microsoft Works 4.5
- Microsoft Greetings Workshop

Code	Description	Price
SWMST051	Microsoft Home Essentials	\$169

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Code	Description	Price
SWMST067	Microsoft Publisher 98	\$159
SWMST069	Microsoft Publisher 98 Upgr. CD	\$129

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Code	Description	Price
SWMST003	Windows NT Workstation 4.0 - New user	\$499
SWMST004	Windows NT Workstation 4.0 - Upgr.	\$249
SWMST048	Windows NT Server 4.0 + 5 user	\$1295
SWMST044	Microsoft Project 98	\$745
SWMST045	Microsoft Project 98 - Upgr.	\$295
SWMST062	Microsoft Encarta 98	\$159

Code	Description	Price
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SWGEN001	Redhat Power tool 6 CD set	\$45
SWGEN002	LINUX - Official Redhat	\$85

## Quarterdeck

Code	Description	Price
SWQUA000	RealHelp Extra Strength	\$85
SWQUA001	Clean Sweep Extra Strength	\$75
SWQUA002	Partition It Extra Strength	\$85
SWQUA003	Virus Sweep Extra Strength	\$85
SWQUA004	Disk Clone	\$60
SWQUA006	Remove-It 98	\$35

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SWMY002	Accounting with Payroll	\$489
SWMY003	Premier Accounting	\$880

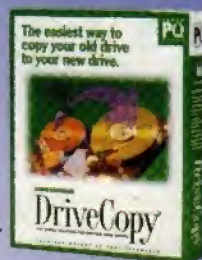
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SWMY004	Asset Manager	\$255

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The award winning way to keep up with customers and prospect - and turn opportunities into sales!

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**\*Continuous Speech Technology**

**\*Natural Language Technology**

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- Natural language commands™
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- Hands-free editing
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# The cover discs: apcmag.cd

These discs have two main aims:

- To provide fast, easy access to the files and resources we talk about in APC and to save you download time and money;
- To make it easy for our readers to get on the Internet so they can use our new interactive Web site.

The kit contains browsers, file-transfer programs, mail and newsreaders and much more for each of the major operating systems. To make it as easy as possible for readers to get online, we've also included reader offers and a sign-up kit.

**apcmag.cd** aims to complement both the magazine and APC's Web site. The concept is simple: when you read about a program in the magazine, such as a piece of software from a Shareware column, you need only insert **apcmag.cd**, browse it with your favourite WWW browser, and download the file directly from the CDs. Each piece of software includes instructions on whether you will need to unzip the file before installing it; most also include Readme files.

## Using the CD

Everything you need to use **apcmag.cd** has been created in HTML. You don't need any special software to access the discs, other than a

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We've provided the software on the CDs for the convenience of our readers — to save you the effort of locating and downloading the material yourself.



As with any site on the Web, the software on this CD is provided as is, in the hope that it will be useful to you, and without any warranty, express or implied. If you're interested in a product or service we review or refer to, contact the company that distributes or supports it for more information, or to discuss any problems you may have with it.

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While we've taken every care to ensure that the software provided is useful and that it works, we cannot accept responsibility or liability for any of the products included.

## How to run the CDs

### Windows 95 and NT users

These CDs use an AutoRun feature for Windows 95 and NT systems. Just insert **apcmag.cd** and your browser will automatically load with the **apcmag.cd** front page.

**Note:** First-time users will be prompted by a browser set-up program (SETUP32.EXE) which will allow them to install a browser or update your current browser. This program is only loaded once, and subsequent use of the CD will automatically start your installed browser.

### Win 3.x, OS/2, Mac, Linux

Simply launch your favourite browser and load the file DEFAULT.HTM in the root directory of the CD.

If you don't have a browser, run the file INSTALL.BAT in the root directory of the CD.

The CDs have been tested using Netscape Navigator 3.0 and 4.0, and MS Internet Explorer 3.0 and 4.0.

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Instructions on 'How to Enter' form part of the Conditions of Entry of all competitions in APC October. Entry is free and open to all residents of Australia other than employees of ACP Publishing Pty Ltd (ACN 053 273 546), suppliers of competition prizes, their families and associated agencies.

The contests close last mail October 24. Enter according to the instructions supplied with the individual competition. The contest will be judged by a panel appointed by ACP Publishing Pty Ltd on October 24, 1998. The judges' decision in relation to any aspect of the competition is final and binding on every person who enters. No correspondence will be entered into. Chance plays no part in determining the winner. No responsibility is accepted for late, lost or misdirected entries. All entries become the property of ACP Publishing Pty Limited, the promoter, 54 Park Street, Sydney, NSW 1028.

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**Fax:** (03) 9820 1134

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**Internet:** apc@acp.com.au

### Reader inquiries/back issues

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**Phone:** (02) 9288 9123

**Email:** ssevers@acp.com.au

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Copies of old issues of APC are available at most local libraries, or from APC, Attn: Simone Severs, PO Box 4088, Sydney NSW 1028.

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**Fax:** (02) 9264 6320

**Email:** workshop@acp.com.au

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*How to make the best use of the Internet to buy and sell goods and services. By Stephen Withers*

## Ecommerce

### Webonomics

The 'clever' cover design incorporating HTML elements and a *Wired* colour scheme (not to mention stereotypically American typography) might put off some potential readers — but don't let that happen to you. Written from a business perspective, this is arguably the most exciting of the books reviewed here, whether you are a consumer or supplier.

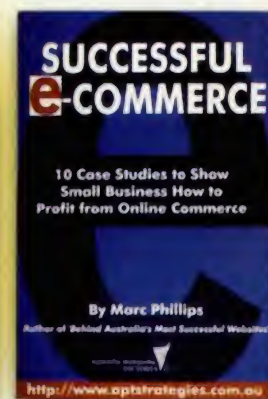
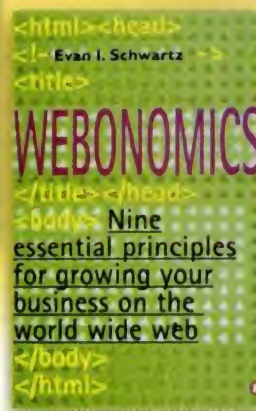
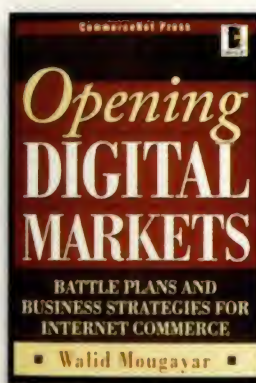
If economics deals with scarcity, webonomics deals with abundance. How can you make money in an environment where millions of people can 'consume' the same item and leave it intact, and where there's more 'stuff' than anyone could possibly consume? Schwartz suggests that people's attention is the factor that's in short supply, and that's what must be addressed.

This thesis underlies nine 'essential principles' for developing a Web-based business, whether starting from scratch or as an extension of an existing enterprise. It would be unfair to give away those principles here, especially as the book is so reasonably priced, but they do cut to the core of what a business is trying to achieve and how a consumer is likely to behave.

Some of the material should be taken as illustrative rather than cold, hard fact. For example, I'm not convinced that Yahoo is that much stronger as a brand in this country than AltaVista or LookSmart, though branding is clearly important. But Schwartz's point that existing brands can either be leveraged or supplanted on the Web seems valid.

An interesting angle on this is the idea that heavily advertised products are information poor: the slogans change, but a Coke is a Coke, and a Big Mac is a Big Mac, whenever or wherever you buy them.

This book is about a year old (though only released locally last December) — a long time when you're dealing with the internet — but some of the assertions have yet to be proven true or false. For example,



"WebTV... is doomed" and "digital cash will fail". Schwartz did have an each-way bet on push technologies, but missed what I suspect was the critical issue — IS managers conserving bandwidth within corporate networks.

Who should read this book? Practically anyone reading this review. Its insights are valuable for looking to make money from the Web, but it also serves to warn Web users what 'they' are trying to do to us.

■ Author	Evan Schwartz
■ Publisher	Penguin
■ Distributor	Penguin
■ Phone	(03) 9871 2400
■ Price	\$17.95
■ ISBN	0-14-026406-X
■ Rating	★★★★

### Successful E-commerce

This collection of 10 Australian case studies draws on a variety of businesses, including retail and wholesale traders and the vendors of information. It also

looks at a company that is using the Internet to exchange engineering drawings, find suppliers and watch for sales opportunities.

Operators of these successful businesses share their experiences, with insights such as: "When you're marketing via the Internet, you must have the best product available" (as other companies can probably be found as easily as yours); "A webpage that takes a long time to download is the online equivalent of a virtual [sic] queue"; "We believe that the [company's] existing Internet infrastructure has paid for itself many times over; however not always in tangible quantitative terms"; and "It is crucial that

### Guide to ratings

★	Sydney water — no go
★★	Adelaide water — a bit risky
★★★	Brisbane water — pretty satisfying
★★★★	Canberra water — quality stuff
★★★★★	Melbourne water — enjoy!



Internet businesses protect their part in the supply chain as you can build the brand and distribution of a supplier's products and not your own".

Other very practical issues — such as cost and security — are addressed, though the book avoids unnecessary technicality. Some of the projects turned a profit in their first year, others are taking longer (one of them expects to be out of the red in three years). The scale of investment varied considerably: some projects involved a few thousand dollars, others required hundreds of thousands.

Phillips presents tips for marketing ecommerce sites; a 10-point checklist for success; and legal and usability issues. He also examines future trends. A variety of payment methods are described, including ecash, offline credit-card transactions, and credit card via Telstra's SureLink service. There's also a directory of ecommerce sites and a list of local suppliers of merchant systems.

Sidebars provide on-the-spot definitions of jargon, backed by a conventional glossary at the end of the book. This is particularly important in a title intended for the general SME community, and Phillips has managed to define even basic terms (such as 'World Wide Web') without condensation.

A few assertions are questionable, such as: "It is generally accepted that the Internet is inherently safer than the open telephone or fax lines when giving credit card information". The core statement may be true, but is it "generally accepted"?

Who should read this book? Owners or managers of SMEs, whether or not they are currently considering ecommerce.

■ Author	Marc Phillips
■ Publisher	Bookman Press
■ Distributor	Bookman Press
■ Phone	(03) 9654 2000
■ Price	\$19.95
■ ISBN	1-86395-376-0
■ Rating	★★★★

## Opening Digital Markets

Perhaps the most important point made by Mougayar in this book is that Internet (or electronic) commerce is not a homogeneous entity. In particular, it isn't just an electronic catalogue/shopfront with a payment mechanism; it is about the whole buying/selling cycle: before, during and after the transaction itself.

He contends that the Internet has five identities — network, medium, market, transaction platform and applications development platform — and that strategies are needed for each. A 10-step plan for 'cybermaturity' is presented, along with a list of key measures for the successful management of Internet commerce.

He suggests that while the Internet allows vendors to bypass traditional distribution intermediaries (reducing markups from as much as 135% to as little as 10%), a new set of intermediaries is appearing that includes certification authorities, electronic payment gateways and electronic directories.

Mougayar also considers the consumer's perspective. When you buy a product from your local shop, it may have been supplied by a particular distributor (think of the vans which deliver confectionery to milk bars, not the national distributors found in the computer industry), which in turn buys from

certain wholesalers and possibly manufacturers. When a consumer uses agent software to identify the most advantageous intermediary, each intermediary must tend towards providing market-leading terms to stand a chance of selection. Or, as Mougayar puts it, "the uncertainty of a transaction journey leads to market efficiency".

The idea of "markets dealing with markets" has exciting possibilities for buyers and sellers. An existing example links one service providing online travel bookings with another that automates expense-report processing. Mougayar gives several examples of intermediary roles that could be played, such as aggregating overnight delivery services, providing a one-stop shop for a variety of carriers.

Mougayar asserts "push technology has taken the Web by storm since early 1997", but apart from email, push has been off the boil for some time (that's 'Internet time' for you!). He is also big on 3D interfaces and representations; while he might prove to be correct, I suspect this is one of the lesser issues.

This title is relevant to people who need a strategic view of ecommerce, but who have either mastered the technical issues or rely on others to fill that gap.

■ Author	Walid Mougayar
■ Publisher	McGraw-Hill
■ Distributor	McGraw-Hill
■ Phone	(02) 9417 4288
■ Price	\$49.95
■ ISBN	0-07-043542-1
■ Rating	★★★

● more reviews on [apcmag.com](http://apcmag.com)

## Off the Shelf

Title	Author(s)	Publisher	Distributor	Phone	Price	ISBN
Creating Stores on the Web	Joe Cataudella, Dave Greely, Ben Sawyer	Peachpit Press	Addison Wesley Longman	(02) 9428 8000	\$49.95	0-20169-681-9
Creating the Virtual Store	Magdalena Yesil	John Wiley & Sons	Jacaranda Wiley	(02) 9805 1100	\$49.95	0-471-16494-1
Essential Business Tactics for the Net	Larry Chase, Nancy Hanger	John Wiley & Sons	Jacaranda Wiley	(02) 9805 1100	\$54.95	0-471-25722-2
Hosting Web Communities	Cliff Figallo	John Wiley & Sons	Jacaranda Wiley	(02) 9805 1100	\$65.00	0-471-28293-6
Internet World Guide to One to One Web Marketing	Cliff Allen, Beth Yaeckel, Deborah Kania	John Wiley & Sons	Jacaranda Wiley	(02) 9805 1100	\$54.95	0-471-25166-6
Marketing Online for Dummies	Bud Smith, Frank Catalano	IDG Books Worldwide	Woodslane	(02) 9970 5111	\$54.95	0-7645-0335-9
Selling Online for Dummies	Leslie Heeter Lundquist	IDG Books Worldwide	Woodslane	(02) 9970 5111	\$54.95	0-7645-0334-0
Understanding Electronic Commerce	David Kosiur	Microsoft Press	Woodslane	(02) 9970 5111	\$44.95	1-57231-560-1
Web Commerce Cookbook	Gordon McComb	John Wiley & Sons	Jacaranda Wiley	(02) 9805 1100	\$81.95	0-471-19663-0



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- Voltage (CPU, Power Supply)
- Fan (CPU, System, Power Supply)
- HDD Statistics
- Memory Statistics
- Chassis Intrusion

### • TOP Tech.:

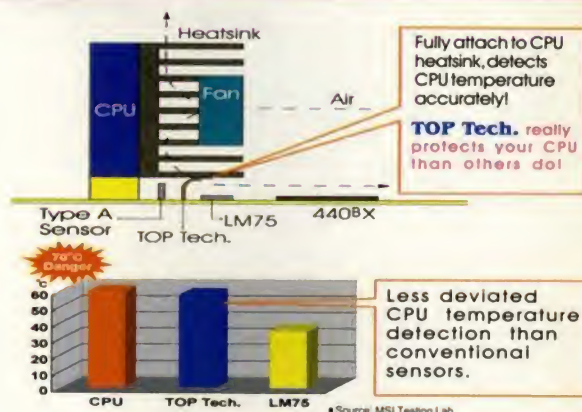
Report CPU Temperature to System Accurately, preserve system stability & life span

### • SoftCooler:

Cool down your CPU effectively without adding burden on your system performance

### • CPU Plug & Play:

BIOS provides frequency and core/bus ratio settings for users to select from.



## System Hardware Monitor Software

- Detect following PC hardware status during real time operation:
  - Temperature (CPU, System)
  - Voltage (CPU, Power Supply)
  - Fan (CPU, System, Power Supply)
  - HDD Statistics
  - Memory Statistics
  - Chassis Intrusion
- Automatically detect language of O.S. and install proper language accordingly
- Available in 7 languages:
  - English, Chinese (Traditional & Simplified), German, French, Russian, Japanese
- Provide error log file for trouble shooting



System Hardware Monitor Software



Software CPU Cooling Device

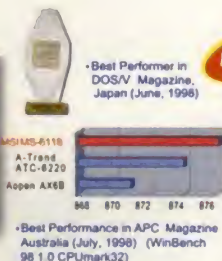
## Software CPU Cooling Device

- Cool down your CPU temperature effectively without adding further hardware
- System performance not affected
- Build-in in PC Alert system hardware monitor software

CPU 33% Cooler in 1st minute!



Intel APAC DEMO Board



## MS-6116

Intel® 440BX AGPset ATX Mainboard

- **CPU:** Intel Pentium® II processor up to 450MHz or faster
- **Memory:** 4 DIMM. Max. 512MB, or 1GB registered SDRAM (Support ECC)
- **I/O:** 2 Serial, 1 Printer, 2 USB ports, Floppy, DA (register)
- **IOS:** ACPI, DMI, PnP, Green
- **Slot:** 3 ISA, 4 PCI and 1 AGP. 30cmx22.5cm, X

Award Winner



## MS-6119

Intel® 440BX AGPset ATX Mainboard

- **CPU:** Intel Pentium® II processor up to 450MHz or faster
- **Memory:** 3 DIMM. Max. 384MB, or 768MB registered SDRAM (Support ECC)
- **I/O:** 2 Serial, 1 Printer, 2 USB ports, Floppy, IrDA (register)
- **BIOS:** ACPI, DMI, PnP, Green
- **Slot:** 3 ISA, 4 PCI and 1 AGP. 30cmx18.6cm, ATX

100



PC MAGAZINE EDITOR'S CHOICE  
 PC Magazine Australia April, 1998

## MS-5169

ALi® Aladdin V AGPset ATX Mainboard

- **CPU:** 75-300MHz or faster Pentium® Processor with MMX™ Technology, AMD K6/K6-2, Cyrix M2, IBM 6x86 processor
- **Clock:** Support up to 100MHz
- **Memory:** 3 DIMM. Max. 768MB SDRAM (100MHz)
- **Cacheable Size:** 512MB
- **I/O:** 2 Serial, 1 Printer, 2 USB ports, Floppy, IrDA
- **BIOS:** ACPI, DMI, PnP, Green
- **Slot:** 3 ISA, 4 PCI, 1 AGP. 30cmx18.6cm, ATX

MSI

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 Fax: 886-2-3234-5488 (REP)  
<http://www.msi.com.tw>

Branch office  
 MSI Computer Australia Pty. Ltd.  
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# SCAN ME

You will find more and more....

Beautiful shape, lightweight body and elegant design, you will fall in love with the appearance of the ARTEC® AM12 at first sight. Examine it more closely, however, and you will find that not only does it look good, it is also intelligent. You just launch the driver, insert the original document, and press a button. The scanner does the rest. The "Automatic Detection" "Automatic Scan" and "Batch Scan" functions make scanning a piece of cake. Of course, let's not forget 3D scanning, color enhancement technology, high scanning speed, 36-bit superior color and 19200-dpi ultra resolution, which we are proud to include in this fine scanner. Yes, the ARTEC® AM12 scanner family is not just beautiful; it is also smart and powerful.

Scan me, You will find more and more....



#### ARTEC® AM12E

- 30-bit true color-over 1 billion colors
- EPP interface, Easy to install; easy to use
- Supports Windows 95, 98 and NT

#### Feature

- Optical resolution 600 x 1200 dpi
- 19200 dpi ultra resolution
- A-4 size; single pass
- Supports Windows 95, 98 and NT
- Long-life cold cathode fluorescent lamp
- Most affordable solution for advanced graphic applications



#### ARTEC® AM12S

- 36-bit true color-over 68 billion colors
- Fully support TWAIN and SCSI-II standards
- Apply to both Macintosh and PC systems



#### ARTEC® 1236P

- CIS scanner
- 36-bit, 600 dpi

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**ARTEC®**



*Take your pick: a trip through your body, around France, or into the past.*

# Have a good trip

## The Human Body — Your Body

This title is based on the fascinating BBC Television series currently screening on the ABC. The first thing you should do is click on Overview, as the organisation of the different segments will be unclear without this short tour.

There are three main sections: Lifestages, Body Labs and You Watcher. The Lifestages segments move "through the journey of conception to death". When you first click on each of these segments you hear a selection of sound bites, either from the narrator, or from various people experiencing that particular stage of life. Out of the context of the TV series, I found these pretty annoying and often inane: "That's why you married me — so I'd cook for you when you couldn't cook." Mother to son: "Leo, bring the shark back please." I stopped listening after a while.

Each segment also brings up a series of body cams. Click on a graphic and you get information about that life stage. This is presented as narration together with either video, graphics or still images, and text.

It is the video presentations that are the highlight of this CD. It is used to especially good effect in the Body Labs section. Here you can explore the body's eight most important systems. Study different sections with graphics and text, or opt for Explorer, which takes you through the whole of that system, often via video. Under Digestion, you can watch the whole videoed journey of a piece of food, from when it is being

chewed, through the digestive system, and on to its expulsion. I won't describe how it deals with that particular part of the proceedings — that would be telling...

The Labs also offer the opportunity to interact with the body functions: guide sperm on their journey to an egg, build your own circulatory system, or fight off antibodies space-invader style.

The third section, You Watcher, allows you to build a personal profile, and gives advice on exercise and diet. You can re-enter your details as you follow the program and check how you're progressing.

The Human Body is highly educational for pre-teens onwards, lots of fun for adults, truly interactive, and full of fantastic video sequences.

**Lindsay Hayman**

■ Publisher	BBC
■ Distributor	Roadshow Entertainment
■ Phone	(02) 9552 8700
■ Price	\$59.95
■ Requires	Pentium 75, Windows 95, 16M RAM, 4x CD-ROM drive, 16-bit colour display, Sound Blaster-compatible soundcard
■ Rating	★★★★☆

## French for the Real World

"Come on in, the language is fine." What a corny intro. Luckily for French for the Real World, the rest of this program is quite good. Forget that you are taking part in a road race in a country whose language you barely speak.

Discard the fact that the game can't accept race entrants from Australia, New Zealand or Great Britain. Ignore the bizarre appearance of Armand the Magnifique and the disturbing images of motorcyclists roaring down the wrong side of the road. The way this program helps to get you familiar with French is very user-friendly and amusing.

The would-be racer is partnered with the slightly spivvy-looking Stephane who talks gratifyingly slowly so dunder-head co-drivers can understand.



The aim of the game is to beat other racers who spend lots of their time gesticulating wildly, Gallic style, as they roar past you, or vice versa. Extra pace in the race is picked up by solving a series of word-related quizzes which reinforce spelling, vocabulary and aural skills as you match pictures to sounds and words, ask and answer questions or simply have fun at a variety of cartoon locations.

The race isn't all road rage though; every now and again the co-driver (you) has to leap out and collect things and send postcards. Smart types can opt for Verb Shortcuts, where they can strut their declension skills and forge ahead of the pack if they get it right — although some are a bit confusing in places.

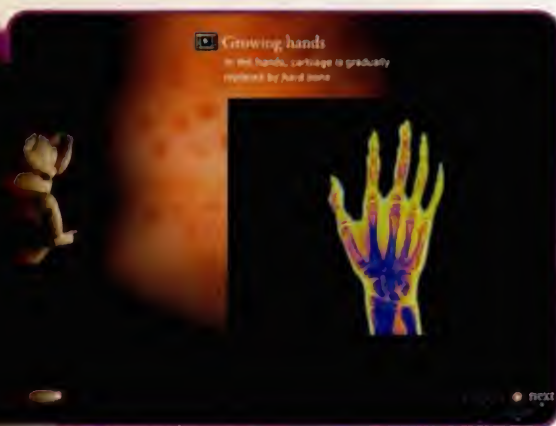
The race meanders across France and takes in a variety of major towns, each of which has a brief note and a few piccies to make it more real. At the end of the race you get to chat back to the program and check your pronunciation after a week of français-fringed cabin fever with Stephane. For the beginner, a quite enjoyable and welcome change from the myriad stiff-as-a-board talking-book-style tutors.

**Jeremy Torr**

■ Publisher	Kaplan
■ Distributor	Dataflow
■ Phone	(02) 9417 9700
■ Price	\$69.95
■ Requires	486/66, Windows, 16M RAM, 4x CD-ROM drive, SVGA
■ Rating	★★★★

## Generations Deluxe Edition

When we reviewed genealogy software in the February edition of APC (see Gene Pool, page





## Interactive News

It's still very unclear just what we will be using to watch movies and TV in the near future, but one thing is definite — it's going to cost. Market research firm ACNielsen recently released details of its research into the future for High Definition TV (HDTV), and estimates that the shift from present TV units to HDTV will cost \$30 billion over the next 10 years. To receive images of the quality of which HDTV is capable you will have to fork out for an expensive new unit, but the Digital Video Broadcasting (DVB) television system that we look set to adopt will work with existing analog TVs, and will be capable of handling Internet access as well.

Whatever the result of the new TV standards, the next big push is into home sound for both TV and home computers. Creative Pacific recently unveiled its new Sound Blaster Live soundcard, which is being touted as an alternative of sorts to Dolby AC-3. Sound Blaster Live will use 'Environmental Audio Extensions' (EAX) to 'extend' Microsoft's Direct Sound and Direct Sound3D. For movies on your PC, the card uses Creative Multi Speaker Surround technology for a surround-sound effect, though a 'device' will soon be released to enable Dolby AC-3 Surround Sound. What it all seems to boil down to is that Creative has created an alternative to its main competi-

tor, Aureal, in PC surround sound, hedging its bets that the trend will develop towards PCs being used more as home entertainment devices that are analogous to TVs.

Giant corporations Sony, Matsushita and JVC are leading the push for the wide-scale adoption of Digital Video, a compression format based on discrete cosine transform (DCT). Digital video is a fast-growing market, used in digital camcorders, and increasingly with PC Cards for video editing. MPEG-2 is still the format of choice for distribution via satellite, cable and such like (including our probable HDTV standard), but in Japan digital camcorders are beginning to outsell analog ones.

101), we noted that Leister Productions had sold the Windows version of its excellent Reunion software to Sierra. This package, renamed Generations, is now available here.

More specifically, it is the equivalent of Reunion 4; a Version 5 edition is promised. This deluxe edition retains the user interface that impressed us so much earlier in the year.

The database limitations are unlikely to be a problem, with maxima of 30,000 individuals per file, 20 children per couple and 26 spouses per person. Date expressions such as "2 days after birth" are accepted and automatically converted to dates. The program knows 2000 is a leap year, and supports dates between 5000 BC and AD 5000.

Generations permits the storage of a variety of information in addition to the basic genealogy facts in either of two user-definable note fields or the miscellaneous field. These entries can be linked to source citations. EasyTree, a separate program within the package, prepares charts that may spread over multiple pages. Scanned photographs and other images can be linked to records and included in printed charts.

Data can be imported and exported in the widely-used Gedcom format, exchanged with Reunion for Macintosh, or exported in tab or comma-delimited format for a spreadsheet or database software.

In addition to an extensive manual, a copy of the book *Netting Your Ancestors* is included. It offers some useful suggestions for starting points for research as well as subject-specific Netiquette. Despite an overall US orientation, resources for a variety of countries are mentioned.

All told, a useful and attractive pack-

age, but we'd rather pay less for a version without the data discs.

**Stephen Withers**

■ Publisher	Sierra
■ Distributor	Dataflow
■ Phone	(02) 9417 9700
■ Price	\$99.95
■ Requires	486/66, Windows 3.1, 12M RAM, CD-ROM drive
■ Rating	★★★★

## Titanic — An Interactive Journey

This CD has some brilliant underwater video footage; a controllable 360° virtual submersible creeps around the wreck of the Titanic showing what life (death, actually) is like two-and-a-half miles below the surface. Image quality is right up there with the best.

It also features such trifles as a newspaper story headlined 'Dogs In Hotels Shock',



quite a few virtually unrelated mentions of US politicians including Henry Ford and Senator Smith (who?), a map of New York offering advice on places of interest and a list of Titanic rescue and salvage trivia that would

amaze the most dedicated Trivial Pursuit player. (Some scientists advised sinking a tanker full of liquid nitrogen on top of the Titanic. The surrounding water would then freeze, so the ice and the encapsulated Titanic, would float to the surface. Duhhh.)

Most of the CD is based on either still photos or drawings accompanied by narration or text explanations. This is a better use of available storage space than lots of video, but can be a bit tedious if you have to wade through yet another series of loony salvage ideas, or more thinly disguised adverts for IFRAMER (the French organisation that led the expedition) to get to the section you want.

The best section is probably the one on the selection of artefacts salvaged from the wreckage. These are extensive, beautifully photographed and, if you can ignore the saccharine captions, very informative. The disc contains over 600 pictures and 200 original illustrations based on the post-wreck inquiry held in New York, but much of the narrative has been paraphrased down and given a quick, easily assimilable editing treatment to produce many gasps of breath but little in-depth analysis. To some extent this removes the feel of history, but the CD is still a good buy for those who have that surprisingly common fixation for the things and human tragedy rolled into one.

**Jeremy Torr**

■ Publisher	Europress
■ Distributor	Europress
■ Phone	(02) 9748 4847
■ Price	\$49.95
■ Requires	486/33, Windows, 8M RAM, CD-ROM drive, SVGA
■ Rating	★★



*There are battles aplenty in GameZone this month. Then again, you may prefer a quiet spot of fishing . . .*

# To your battlestations!

## Descent: Freespace, The Great War

I hereby nominate Freespace for a 'Best Use of 3D Acceleration' award. It's also a damn fine space game, and its only connection with Descent is shared programmers.

You can play Freespace without a 3D card, but if you do own one, you're in for the ride of your life — not just because the



card graphically enhances the game, but it also gives it a speed boost (from either 3Dfx Glide or Direct3D).

Many games drag 3D cards down through overuse of textures and complex objects; but everything in Freespace is so well optimised that amazing events become possible without noticeable slowdowns: spaceships that are several kilometres long, displayed in awesome detail; epic battles between vast numbers of craft; scary aliens, believable AI; massive explosions with real debris; terrific audio; a mission editor; and multiplayer combat in space.

Slick programming also means the game is highly configurable. The amount of features in the cockpit HUD and settings on the options screen will amaze tinkerers and simulation fans alike (despite the unrealistic space flight feel). Patch updates can be downloaded online from within the game, and the mission editor is quite flexible. In fact, Interplay will include user-designed missions in its ongoing level pack.

On the downside, Freespace's plot is linear (unlike a Wing Commander game, where the player's actions affect the storyline) and the cinematics are predictable. APC also experienced problems with the sound, which dropped out during cinematics on two PCs.

The only character development is your own, which makes this single-player game a lonely trek through a world that is supposed to be full of comrades. One solution is to keep reading the professionally written Freespace fiction, which appears weekly at <http://www.interplay.com/freespace/> (or you could submit your own). Successful play over the Internet requires way too much bandwidth, which means it's hard to find players and you'll find yourself wishing for a LAN.

Freespace has a superior engine and better mission design than any rival space sim. It's a thrill to play and therefore a worthy purchase for space fans; but it doesn't quite manage to suck the player into the main plot.

**Simon Vandore**

■ Distributor	Electronic Arts
■ Phone	(02) 9955 7744
■ Online	<a href="http://www.interplay.com/">http://www.interplay.com/</a>
■ Price	\$89.95
■ Requires	Pentium 166 or Pentium 133 (with 3D accelerator), 32M RAM, 6x CD-ROM drive, DirectX 5.0
■ Classification	G 8+
■ Rating	★★★★

## MechCommander

"Mech fall over. Go boom." So a Battletech-obsessed friend of mine kept saying as I played MechCommander, the latest in a long line of Battletech-inspired games.

Microprose is well known for producing high-quality strategy/management games, and its first MechWarrior game seems to be continuing this tradition. MechCommander plays somewhat like a

cross between Warcraft and Syndicate on a Civilisation II map.

Instead of the most recent games, which gave you control over a single MechWarrior, MechCommander gives you command over multiple Mechs at one time. Thanks to the extremely intuitive command interface, this is much easier than it might seem. The command interface is primarily mouse-based, although after a while you find yourself using a keyboard/mouse combination.

MechCommander incorporates a good learning curve — early missions allow you to explore, get used to controlling your Mech squads and sort out some simple tactics. Later on, things become more complex, and you find yourself commanding one squad to run interference so that you can sneak-attack bigger Mechs while capturing vital supplies . . . while under aerial attack.

Graphically this game really stands out, from the detailed maps to the close-up views of the Mechs themselves. It is full of great little touches, such as damaged Mechs and exploding high-detail scenery. This high-quality approach is also carried over to the sounds: your troops react to events, panic when in trouble, and scream in terror when forced to eject.

MechCommander should appeal to strategy freaks and those looking for a suitable (and not too difficult) strategy game.



Oh, and, of course, the 'Mech fall over. Go boom' crowd. But in their case MechCommander is preaching to the converted.

**Alex Kidman**

■ Distributor	Microprose
■ Phone	(02) 9953 8788



- **Online** <http://www.mechcommander.com/>
- **Price** \$89.95
- **Requires** Pentium 133, 16M RAM, 4x CD-ROM drive, 150M hard disk space
- **Classification** G 8+
- **Rating** ★★★★★

## Might and Magic VI: The Mandate of Heaven

Apart from Interplay's innovative Fallout, there has been a sad lack of good role-playing games (RPGs) on the market over the last few years. For the RPG fanatic, however, the next year looks like being a bumper one, with some very impressive titles on the horizon, such as Fallout 2, Baldur's Gate, Diablo 2 and Ultima Ascension. Heading this crop is the latest episode in the long-running Might and Magic saga: Might and Magic VI: The Mandate of Heaven (MM6).

MM6 is a very traditional first-person RPG, in the style pioneered by the likes of the Eye of the Beholder series. It's set in a typical fantasy milieu, has the usual array of character types (knights, sorcerers, clerics, druids), spells (fireball, anyone?) and monsters (skeletons, dragons, wizards). Nothing terribly new there.

What is so good about MM6, however, is how well the game is executed. All the annoying things in previous RPGs have been taken care of. Prefer turn-based combat? It's an option. Or you can just use the default real-time combat. Annoyed at having to scroll through a massive list of spells every time you want to cast? Just ready a quick spell (in any case, they're arranged so you can find the spells you want easily). Notes, mapping, hints, quests, locations — they're all taken care of.

The plot is extremely non-linear: you can travel around the vast world, completing an array of miscellaneous missions (there are

over 50 significant quests) at will, building up your power and equipment, and readying your characters to deal with the menace that threatens the land of Enroth — an invasion of demons.

To complete all the missions in game time would take years, and you have the feeling in real-time it will take just about as long. There are easily months of play time available.

If you're looking for the latest and greatest in 3D graphics rendering engines, look elsewhere. This isn't Unreal. That said, MM6's graphics and sound are a cut above most other 3D RPGs — although it did tend to stutter a bit on lower end machines (we even experienced poor performance on a 200MHz Pentium). It's all software driven, so you don't need the latest and greatest 3D cards.

It isn't technical brilliance that makes a good RPG, however; it's plot and gameplay, and this is where Might and Magic really shines. It is easily one of the best RPGs ever released.

**Nathan Taylor**

- **Distributor** Directsoft
- **Phone** (02) 9482 3455
- **Online** <http://www.3do.com/mm6/>
- **Price** \$63
- **Requires** Pentium 90, Windows 95/NT, 16M RAM
- **Classification** M 15+
- **Rating** ★★★★★

## Trophy Bass 2 Deluxe

Anglers of the world — no longer do you have to endure the physical tortures often associated with going fishing; no more travelling to secluded fishing holes, no more face-numbing wind and no more waiting around for a bite that will never come.

Playing Trophy Bass 2 on the PC may not be quite the same as an outing to the lake, but you would be hard-pressed to find a better substitute. This game gives you the pleasure of a simulated fishing trip, and it may also teach you some of the finer points of the art of fishing, which you can try out next time you're getting your feet wet... well, your boots anyway.

There are 15 American lakes on which to fish. Photographic and



topographical maps, together with the accurate layout and depths of each of the lakes, brings an element of realism to the game. A large navigational map allows you to direct your boat with the arrow keys, while a sonar display indicates where the fish can be found.

As with conventional fishing, the process of selecting the correct lure, rod and casting style is an important aspect for enticing, hooking and landing a fish.

Single-player games can be played as either quick trips, tournaments or careers. Teaming up with or competing against fellow anglers from around the world certainly beats playing by yourself. The WON Internet game facility can be accessed with little fuss and there is always a decent number of players to go fishing with. You can also play multiplayer games on a LAN or via modem.

Difficulty levels range from easy to hard, and the game can be customised to a level of realism that is right for you. Elements of realism that can be adjusted include the population density of fish, the visibility of fish in the water and the time with which a fish can be landed.

Getting the difficulty settings right is the key to an enjoyable day on the water. Too easy and the fish will be jumping





# MicroGram Computers

## 100Mbps Network Starter Kit



This kit comes with all the hardware components required to build a 100Mbps network for two PC's as well as a comprehensive installation manual. All

software is part of Win 95/98/NT. The 100Mbps Network Starter Kit provides the most cost-effective solution for users who desire fast throughput at the cost of traditional 10Mbps. The kit includes one 4 port 100Mbps Fast Ethernet hub, two 10/100Mbps PCI Fast Ethernet adapters, two 5 metre Cat. 5 network cables and software drivers for the adapters.

Cat. 11900 **100Mbps Network Starter Kit** \$339

## Internet Access Server

Internet for everyone! Give all stations on your network simultaneous access to the Internet through this access server. Hardware based firewall ensures your security, while dial on demand minimizes your connect time. It has a built-in DHCP server & includes software to provide clients with their own email address. This pocket-sized Internet-Sharing device provides one communication port (DB25) for Internet access and one RJ-45 port for connection to your 10Base-T Ethernet network. Supports easy Internet connection to your Internet Service Provider via modem or ISDN.



Cat. 10100 **Internet Access Server** \$499

## 10/100Mbps 3 Parallel Port Print Server



Up to three printers can be connected simultaneously with this three parallel port 10/100Mbps

print server. Designed with auto-sensing dual-speed capability it auto detects the speed of the network, i.e. 10Mbps or 100Mbps. Built-in TCP/IP and IPX protocol support for Windows 95, Windows NT, NetWare and UNIX is provided along with built-in web management capability and flash memory. DHCP server support automatically assigns IP address.

Cat. 11293 **10/100Mbps 3 Parallel Port Print Server** \$519  
Cat. 11288 **10Mbps 1 Parallel Port Print Server** \$269

## 10/100Mbps Ethernet Cards

able to auto sense either 10Mbps or 100Mbps operation, this PnP PCI Ethernet card uses the Bus Master architecture to maximise throughput.

Cat. 11282 **Ethernet Card PCI UTP/STP 10/100Mbps** \$59  
Cat. 11271 **Ethernet Card PCI BNC UTP/STP** \$39  
Cat. 11272 **Ethernet Card ISA BNC/UTP PnP Jmp** \$39

## Web-Based Training from \$9.95 per month\*

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A number of courses are "Microsoft Certified Professional - Approved Study Guides"

\*Full details at [www.tol.com.au](http://www.tol.com.au)

Over 160 courses on offer

## 100Mbps Ethernet 5 Port Hub Card



Mounts on the back plane of a computer but does not plug into a slot, it only connects to the power supply. No separate case and power supply means

reduced costs, plus everything is kept neat & tidy inside the computer.

Cat. 11294 **Ethernet Hub Card 5 Port UTP 100Mbps** \$259  
Cat. 11287 **Ethernet Hub Card 5 Port UTP 10Mbps** \$89

## 10Mbps Ethernet 5 Port Hub & LAN Card

Internal PCI Plug & Play 5 Port hub and LAN card does not require external power supply and is a cost effective solution for SOHO users. One port can be used as an uplink port for easy expansion, or used for hub connectivity at the server.

Cat. 11295 **Ethernet Hub & LAN Card 5 Port UTP 10Mbps** \$109

## Serial Cards

We have a large range of serial cards providing either 1, 2, 4 or 8 ports. Our most popular and versatile single, dual & four port cards feature high speed 16550 UARTS, COM 1 to 8 and IRQ 3 to 15.

Cat. No. 2297 **1 Port RS232 16550 COM1-8, IRQ 3-15** \$80  
Cat. No. 2239 **2 Port RS232 16550 COM 1-8 IRQ 3-15** \$99  
Cat. No. 2326 **4 Port RS232 16550 COM 1-8 IRQ 3-15** \$295

The dual port card is now available with 16650 UART chips with 32 byte FIFO buffers.

Cat. No. 2333 **Two Port 16650 Serial Card** \$159  
Plug & Play PCI models also available.

## Hard Disk Drive Duplicators

These hard disk drive duplicators offer a low cost, high performance solution whether you want high-volume 1 master to 8 drive copying or quick, low volume, 1 master to 2 drive copying. Features include:

- FAT32 compatible
- Track by track, file by file, whole or partial drive copying
- Accepts different geometry drives including 2.5" and 3.5" drives
- Copy Win 95 / 98 operating systems in minutes

Cat. No. 6426 **Hard Drive Duplicator Two Drives** \$2899  
Cat. No. 6427 **Hard Drive Duplicator Eight Drives** \$6499



## Year 2000 BIOS Card



Even Pentium motherboards are not immune to the Year 2000 bug! The Year 2000 BIOS Card solves the problem of progression from 1999 to 2000 as well as 21st century leap years. It is an 8-bit card which provides year 2000 support for motherboards with a BIOS which only stores the year with two digits, i.e. 97 instead of 1997.

Cat. 3359 **Year 2000 BIOS Card** \$129

## Video Conferencing Kit

A high performance PCI full-motion video/still image capture solution for video conferencing on the net! The kit includes video capture card, CCD camera & VDO.Net's video conference software. Ideal for applications such as Video Mail, Video Conferencing or Full-Motion Video Capture to AVI file format.



Cat. No. 3356 **Video Conferencing Kit** \$299

## Watch-Dog Timer



By adding a timing reset instruction to the outer loop of your program, this card will apply a hardware reset to the computer in the event of a lock up. Utility software included for DOS, Windows 3.1, Win 95, Windows NT, OS/2 & UNIX.

Cat. No. 17044 **WatchDog Timer Card** \$139  
Cat. No. 17050 **WatchDog Timer II Card** \$349

## Omni-Directional Laser Scanner

An affordable, vertically mounted, Omni-Directional laser scanner, which is ideally suited to reading bar coded products at supermarket checkouts. Performance is higher than the "Name Brands" with a 24 scan line pattern (competitors' products are 20) and 2,400 scans/sec (competitors': 2000 scans/sec). The depth of field is 300mm and it is available in either KB wedge or serial models.



Cat. No. 8521 **Bar Code Laser Omni-Direct. KB Wedge** \$2119  
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the boat; too hard and you'll want to throw in the towel. Or the rod, as the case may be.

Kieran McNamee

■ Distributor	Dataflow
■ Phone	(02) 9417 9700
■ Online	<a href="http://www.sierra.com/">http://www.sierra.com/</a>
■ Price	\$69.95
■ Requires	Pentium 90, 16M RAM, 4x CD-ROM drive, 100M hard disk space (supports Microsoft Force Feedback joystick)
■ Classification	G
■ Rating	★★★

## Xenocracy

Space combat fans have been well served recently, with several quality games hitting the shelves, including Wing Commander: Prophecy; Descent: FreeSpace (reviewed here); and X-COM: Interceptor. Even LucasArts has reissued the venerable X-Wing series, updated to take advantage of the latest graphics hardware.

Often when a genre becomes crowded, the new kid on the block has a hard time offering anything original or compelling. Xenocracy is a case in point.

It is the year 10,600, and the solar system superpowers are waging a covert war over access to the vital ore Lycosite (yes, another game in which mighty economies are strangely dependent on a single commodity). Keeping these competing forces in check is the United Planet



to respond to each planet's calls for help, choosing combat missions that you judge will best maintain the balance of power in the solar system.

The game has an arcade mode for those who prefer to go straight to the action. If, however, you enjoy diplomacy and resource management (albeit somewhat rudimentary), then choose the full simulation. Here you can make use of comprehensive databases and audiovisual briefings to configure your missions. Unfortunately, this background information often seems peripheral to the plot, making the game less immersive than it might otherwise be. Even with the briefings, it can still be dif-

ficult selecting missions that match your present level of expertise.

The flight and fight aspects of Xenocracy are good. It incorporates attractive 3D graphics and an easy-to-master interface. For those who have played X-Wing, the controls will be especially familiar: there is an identical use of radar, and the same balancing of power between shields, engines and weapons. While this might initially seem an advantage, in the long run it is symptomatic of the game's most serious problem — in an already crowded category, it needs to offer a little more originality.

Jon Gill

■ Distributor	Teco Multimedia
■ Phone	(03) 9720 9833
■ Online	<a href="http://xenocracy.grolier.co.uk/">http://xenocracy.grolier.co.uk/</a>
■ Price	\$79.95
■ Requires	Pentium 133, Windows 95, 16M RAM, 4x CD-ROM drive, 2M SVGA video card, joystick recommended
■ Classification	G 8+
■ Rating	★★★

● more reviews on [apcmag.com](http://apcmag.com)

## Games News

● The demo version of Sin has been released, and it's a hefty 45M download. A few words of caution, though: first, only download the demo from a reputable source, such as Activision itself or one of the sites it nominates, or from a magazine cover CD. A few third-party sites contained versions of the demo that were infected by the CIH virus, which can be very hazardous to your PC's health. Secondly, once you do get hold of the demo, prepare yourself for an introductory sequence that replays every action-movie cliché in the book, replete with terrible overacting and woeful dialogue. Even so, it's a great game and well worth a look.

● It is with sadness that Gamespy has to report the death of one of the best games developers ever. Dani Bunten Berry was responsible for such classics as M.U.L.E., Modern Wars, and Seven Cities Of Gold,

among others. She was one of the pioneers of multiplayer gaming, and her influence over designers and developers is still pervasive today. She was recently honoured at the Computer Game Developers Conference with a lifetime achievement award. You can read some of the tributes at <http://www.mpath.com/dani>. ● You might remember the fracas that developed over the initial release of Derek Smart's awesome Battlecruiser 3000AD, when publisher Gametek released the game before it was finished and claimed ownership of the product, leaving Smart with a court case on his hands. Well, Smart is back, and 10 years after the inception of the project he's almost ready to release the final version — Battlecruiser 3000AD 2.0: The Developer's Edition. Those who have already purchased the game will be able to download a patch free (though it will work with the free version carried on many magazine cover CDs). To top off, he has announced that the sequel is already in development!

Gamespy



Nations (UPN), a kind of interplanetary parent whose task it is to carefully play the squabbling planets off against each other in a continuous struggle to avoid all-out solar war.

You play the WingToucher, commander of an elite UPN squadron. Your task is



Reviewing the reviewers: sites and samples of music reviews online.

# The food of life

## Addicted to Noise

Careening from folk music to R&Bs lite, Addicted to Noise tries to be all things to all people. While it may not succeed on this level, it is an interesting window to some new music which is otherwise ignored by mainstream media.

The site is easy to navigate, with side tabs delineating reviews, features, news and columns. The ability to flick between sections soon loses its sheen, however, thanks to the site's poor dial-up performance. Similarly, since I lost patience just waiting for pages to load, I didn't even attempt playing the music samples.

The site features writers from both Australia and the US and provides fairly good coverage of Australian bands and the local scene, including news on independent record labels. Most of the other content appears to originate from the US — one feature, on Midnight Oil's latest release, was the only exception.

Despite its fairly naff name, Addicted to Noise is not just a vehicle for the same old middle-of-the-road records heard everyday on mainstream radio. Care has been taken to include all music styles, including often ignored folk and country

lar culture writing. Highlights include a story on Woody Guthrie, a 1940s folk artist, depicting how Guthrie's music inspired many later artists despite his limited acceptance in the mainstream. Another example is the column on French rap. The author, an American, although he is bemused, approaches the subject seriously, comparing the French style with the more well-known American version.

The site could also be described as a mile wide and an inch thick. Don't expect comprehensive coverage on any particular music style; instead, appreciate the opportunity to broaden your musical horizons.

Deanne McIntosh

Online <http://www.addicted.com.au/>  
Rating ★★★

## Pitchfork

Daily music reviews, off-beat interviews and a large selection of music that isn't entirely mainstream is the substance of Pitchfork.

The site is divided into five sections: Reviews, Interviews, Columns, Special Reports and Live Photos. Reviews is the most comprehensive: four music commentaries are posted every weekday, and give ratings out of 100. Each review is accompanied by a 32-second MPEG-2 sound clip.

The reviews are humorous and often take an unusual approach. In a particularly unfavourable review (it only scored 35% on the Pitchfork scale), Michael Sandlin attributes this comment about the group Swell to American TV character Captain Kangaroo: "Swell's 'For All The Beautiful People' does remind me of a strawberry pop tart". The disclaimer at the bottom states: "This review is a piece of satirical fiction. We did not interview Wilford Brimley, the deceased Captain Kangaroo, or Tabitha Soren . . . Michael Sandlin's comments on Swell's recording, however, do represent his actual opinions". Quite a few Q&A reviews contain similar disclaimers.

The Verve's third album, 'Urban Hymns', is described as mimicking "the feeling one gets the day after being bed-ridden sick forever and walking out into a 59-degree cool, fresh, lung-numbing Octo-



ber morning to have a picnic of herbal tea, citrus, and damn good donuts with your lover". It scored 89% — an Excellent rating, just short of the Classic category. A sample of one week's reviews included: Bauhaus, Heather Nova, Lionrock and Social Distortion.

The Interview Archive was "undergoing some major reconstructive surgery", when we entered, although the changes look promising. There is no search function but articles are listed in alphabetical order by artist, and date back to February 1996. The archive contains nearly 100 interviews which tend to take a fun, light, and lively approach. The writers are refreshingly honest and don't hold back if they think an album is no good. If the Australian Office of Film and Literature classified this site it would probably label it 'medium level course language and adult themes'.

The columns are not as up-to-date as other sections; the fash! section contains only four columns, all posted in 1997. The Three Blocks From Groove Street columnist is a little more prolific. In one column he wrote about how he ended up unemployed, and included a letter of his performance assessment.

The most disappointing section is Live Photos, which only had two postings when we visited — four not-very-good photos of The Smashing Pumpkins playing live in Minneapolis and six shots of The Creatures. Since both were new postings in August, there will no doubt be more soon.

The rest of the content is regularly posted; interviews and special reports are posted almost every week.

Pitchfork's main downfall is that it isn't very well maintained — a lot of the



ip Hop and R&B, which is often by Australian radio and music present in both the reviews and here's also a nice blend of well-formers and newer acts.

mns featured on Addicted to the artists that will never make The choice of topics and style as are idiosyncratic, and, like content on the site, lack the music-speak of most popu-



interviews are old and the pages haven't been updated, so some of the links don't work.

Claire Waddell

■ Online <http://www.live-wire.com/>  
 ■ Rating ★★★

## The Den

Album reviews are the lifeblood of any music publication claiming to be even moderately comprehensive. The anorak wearers among music fans — you know you're one when, despite having a pathological loathing for Stevie Nicks, you read a Fleetwood Mac album review anyway — love record reviews for the scope and useless trivia they provide. Once you're familiar with a particular writer's style and preferences, reviews can also become useful buying guides.

The Internet should really be the ultimate resource for review aficionados. Unlike conventional music magazines, the only production schedule binding Internet publications is the energy and zeal of those that produce them — which makes it a real pity that it's so difficult to find music publications online that take advantage of this freedom.

The Den tries very hard to use the Net to its full extent without overtaxing its readers with meaningless and endless downloads of video clips, sound clips and other multimedia bandwidth eaters. It provides daily record reviews, music news and interviews, along with a daily TV and movie section. Its daily updates of UFO and alien sightings worldwide will appeal to sci-fi geeks.

The problem with The Den is that its reviews are predictable, both in tone and subject matter. It restricts itself to what Americans broadly label 'alternative' material. Sadly, this categorisation ignores far more than it covers. What would traditionally be called 'pop' doesn't get a guernsey; nor does metal, non-mainstream electronic, blues, classic reissues or ambient. Review writers don't get a byline either, so it's difficult to establish a rapport with any particular writer.

The Den's archive could be the site's real saving grace, but without a search engine it's a little difficult to find a particular group quickly. This problem is compounded by the practice of grouping reviews in the order in which they were posted, making it well nigh impossible to make a rational guess about where a particular review is archived.

That popular music tastes are driven by

## Surfbaud: The year punk broke

In 1977 the Sex Pistols released 'God Save the Queen' on an unsuspecting public, in the process inspiring a whole generation of youngsters who thought 'if they can do it, so can we'.

Paradoxically, the Pistols were almost the antithesis of everything they came to represent; with the exception of the bass player, whose amp was often turned down during gigs, all were accomplished musicians. Their image, allegedly a reflection of street culture, was in reality carefully constructed by their manager Malcolm McLaren and designer Vivienne Westwood.

But the movement they inspired, as contrived as it was in the beginning, became a legitimate expression of youthful angst and came to represent the zeitgeist of an entire generation. And for every thousand kids that thought 'I can do that', and failed dismally, there were one or two who succeeded. The key message of punk was that central to rock there was a DIY ethos — a message reflected 10 years later in Sonic Youth's *TeenAge Riot* (I've got a chord and a pedal... and that'll do for now), and 10 years after that in Beck's *Where it's at* (I've got two turntables and a microphone).

The Web, when it burst Sex Pistols-like into the public consciousness in 1994, was largely propelled by the same DIY ethos that drove punk. The catchcry 'Information wants to be free!' reverberated around the world. I've got a modem and a computer... and that'll do for now.

For a brief, fiery moment people believed that it was possible to publish and compete on the same terms as the estab-

lished media, just as it was possible for the Pistols to come from nowhere and compete with the hoary old supergroups and disco queens of the '70s. This attitude was encapsulated in the phrase 'on the Internet, no-one knows that you're a dog'.

Just as some were able to parlay punk into a successful career — groups like the Cure and individuals such as Talking Heads' David Byrne come to mind — some individuals and organisations have been able to turn the Web's early punk drive into a career. The difference between Yahoo's Jerry Yang and Netscape's Marc Andreessen is that while David Byrne and the Cure's various members might be comfortably wealthy, the computer guys are in possession of paper wealth measuring billions. No rock star, nor any musician, with the possible exception of Andrew Lloyd Webber, has ever become this rich.

Success in punk, and in Web ventures, is determined by the confluence of a number of factors — not the least of which is pure luck. Success is also determined by wealth obtained through the backing of established entities. Netscape and Yahoo obtained venture capital, undertook IPOs and became corporations themselves. The Sex Pistols were originally signed and quickly dropped by record label EMI (after a healthy advance had been paid). Virgin records picked them up and provided the production and distribution facilities that enabled the public to buy 'God Save the Queen'.

In both areas, the original driving eth was quickly undermined by raw commercial reality. Punk and the Web sold out.



spin doctors and image makers lurking in the back rooms of record companies is obvious to anyone with a modicum of interest in music. Publications that are able to see through this spin, even if they agree with it, are valuable. Publications

able to take a historical perspective avoiding an 'everything was better '60s' tone are even more so.

The Den is neither of these devoted slave to fashion, happy-gitating record company spin and 'reviews'. In fairness, this is exactly what The Den's audience — they want to know what's in. They want security and the that there are a lot of people who are just like them. Musicians, however — better decisions, as snobs — should get wide berth.

Josh Gliddon

■ Online <http://www.t>  
 ■ Rating ★



*How to make the best use of the Internet to buy and sell goods and services. By Stephen Withers*

## Ecommerce

### Webonomics

The 'clever' cover design incorporating HTML elements and a *Wired* colour scheme (not to mention stereotypically American typography) might put off some potential readers — but don't let that happen to you. Written from a business perspective, this is arguably the most exciting of the books reviewed here, whether you are a consumer or supplier.

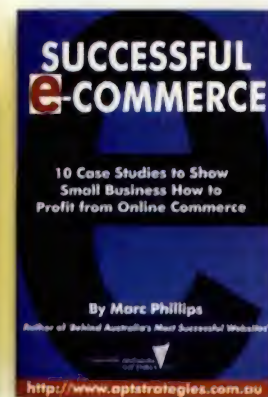
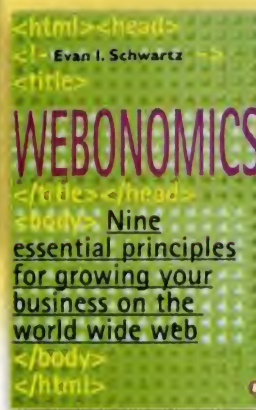
If economics deals with scarcity, webonomics deals with abundance. How can you make money in an environment where millions of people can 'consume' the same item and leave it intact, and where there's more 'stuff' than anyone could possibly consume? Schwartz suggests that people's attention is the factor that's in short supply, and that's what must be addressed.

This thesis underlies nine 'essential principles' for developing a Web-based business, whether starting from scratch or as an extension of an existing enterprise. It would be unfair to give away those principles here, especially as the book is so reasonably priced, but they do cut to the core of what a business is trying to achieve and how a consumer is likely to behave.

Some of the material should be taken as illustrative rather than cold, hard fact. For example, I'm not convinced that Yahoo is that much stronger as a brand in this country than AltaVista or LookSmart, though branding is clearly important. But Schwartz's point that existing brands can either be leveraged or supplanted on the Web seems valid.

An interesting angle on this is the idea that heavily advertised products are information poor: the slogans change, but a Coke is a Coke, and a Big Mac is a Big Mac, whenever or wherever you buy them.

This book is about a year old (though only released locally last December) — a long time when you're dealing with the Internet — but some of the assertions have yet to be proven true or false. For example,



"WebTV... is doomed" and "digital cash will fail". Schwartz did have an each-way bet on push technologies, but missed what I suspect was the critical issue — IS managers conserving bandwidth within corporate networks.

Who should read this book? Practically anyone reading this review. Its insights are valuable for looking to make money from the Web, but it also serves to warn Web users what 'they' are trying to do to us.

■ Author	Evan Schwartz
■ Publisher	Penguin
■ Distributor	Penguin
■ Phone	(03) 9871 2400
■ Price	\$17.95
■ ISBN	0-14-026406-X
■ Rating	★★★★

### Successful E-commerce

This collection of 10 Australian case studies draws on a variety of businesses, including retail and wholesale traders and the vendors of information. It also

looks at a company that is using the Internet to exchange engineering drawings, find suppliers and watch for sales opportunities.

Operators of these successful businesses share their experiences, with insights such as: "When you're marketing via the Internet, you must have the best product available" (as other companies can probably be found as easily as yours); "A webpage that takes a long time to download is the online equivalent of a virtual [sic] queue"; "We believe that the [company's] existing Internet infrastructure has paid for itself many times over; however not always in tangible quantitative terms"; and "It is crucial that

### Guide to ratings

★	Sydney water — no go
★★	Adelaide water — a bit risky
★★★	Brisbane water — pretty satisfying
★★★★	Canberra water — quality stuff
★★★★★	Melbourne water — enjoy!



Internet businesses protect their part in the supply chain as you can build the brand and distribution of a supplier's products and not your own".

Other very practical issues — such as cost and security — are addressed, though the book avoids unnecessary technicality. Some of the projects turned a profit in their first year, others are taking longer (one of them expects to be out of the red in three years). The scale of investment varied considerably: some projects involved a few thousand dollars, others required hundreds of thousands.

Phillips presents tips for marketing ecommerce sites; a 10-point checklist for success; and legal and usability issues. He also examines future trends. A variety of payment methods are described, including ecash, offline credit-card transactions, and credit card via Telstra's SureLink service. There's also a directory of ecommerce sites and a list of local suppliers of merchant systems.

Sidebars provide on-the-spot definitions of jargon, backed by a conventional glossary at the end of the book. This is particularly important in a title intended for the general SME community, and Phillips has managed to define even basic terms (such as 'World Wide Web') without condescension.

A few assertions are questionable, such as: "It is generally accepted that the Internet is inherently safer than the open telephone or fax lines when giving credit card information". The core statement may be true, but is it "generally accepted"?

Who should read this book? Owners or managers of SMEs, whether or not they are currently considering ecommerce.

■ Author	Marc Phillips
■ Publisher	Bookman Press
■ Distributor	Bookman Press
■ Phone	(03) 9654 2000
■ Price	\$19.95
■ ISBN	1-86395-376-0
■ Rating	★★★★

## Opening Digital Markets

Perhaps the most important point made by Mougayar in this book is that Internet (or electronic) commerce is not a homogeneous entity. In particular, it isn't just an electronic catalogue/shopfront with a payment mechanism; it is about the whole buying/selling cycle: before, during and after the transaction itself.

He contends that the Internet has five identities — network, medium, market, transaction platform and applications development platform — and that strategies are needed for each. A 10-step plan for 'cybermaturity' is presented, along with a list of key measures for the successful management of Internet commerce.

He suggests that while the Internet allows vendors to bypass traditional distribution intermediaries (reducing markups from as much as 135% to as little as 10%), a new set of intermediaries is appearing that includes certification authorities, electronic payment gateways and electronic directories.

Mougayar also considers the consumer's perspective. When you buy a product from your local shop, it may have been supplied by a particular distributor (think of the vans which deliver confectionery to milk bars, not the national distributors found in the computer industry), which in turn buys from

certain wholesalers and possibly manufacturers. When a consumer uses agent software to identify the most advantageous intermediary, each intermediary must tend towards providing market-leading terms to stand a chance of selection. Or, as Mougayar puts it, "the uncertainty of a transaction journey leads to market efficiency".

The idea of "markets dealing with markets" has exciting possibilities for buyers and sellers. An existing example links one service providing online travel bookings with another that automates expense-report processing. Mougayar gives several examples of intermediary roles that could be played, such as aggregating overnight delivery services, providing a one-stop shop for a variety of carriers.

Mougayar asserts "push technology has taken the Web by storm since early 1997", but apart from email, push has been off the boil for some time (that's 'Internet time' for you!). He is also big on 3D interfaces and representations; while he might prove to be correct, I suspect this is one of the lesser issues.

This title is relevant to people who need a strategic view of ecommerce, but who have either mastered the technical issues or rely on others to fill that gap.

■ Author	Walid Mougayar
■ Publisher	McGraw-Hill
■ Distributor	McGraw-Hill
■ Phone	(02) 9417 4288
■ Price	\$49.95
■ ISBN	0-07-043542-1
■ Rating	★★★

● more reviews on [apcmag.com](http://apcmag.com)

## Off the Shelf

Title	Author(s)	Publisher	Distributor	Phone	Price	ISBN
Creating Stores on the Web	Joe Cataudella, Dave Greely, Ben Sawyer	Peachpit Press	Addison Wesley Longman	(02) 9428 8000	\$49.95	0-20169-681-9
Creating the Virtual Store	Magdalena Yesil	John Wiley & Sons	Jacaranda Wiley	(02) 9805 1100	\$49.95	0-471-16494-1
Essential Business Tactics for the Net	Larry Chase, Nancy Hanger	John Wiley & Sons	Jacaranda Wiley	(02) 9805 1100	\$54.95	0-471-25722-2
Hosting Web Communities	Cliff Figallo	John Wiley & Sons	Jacaranda Wiley	(02) 9805 1100	\$65.00	0-471-28293-6
Internet World Guide to One to One Web Marketing	Cliff Allen, Beth Yaeckel, Deborah Kania	John Wiley & Sons	Jacaranda Wiley	(02) 9805 1100	\$54.95	0-471-25166-6
Marketing Online for Dummies	Bud Smith, Frank Catalano	IDG Books Worldwide	Woodslane	(02) 9970 5111	\$54.95	0-7645-0335-9
Selling Online for Dummies	Leslie Heeter Lundquist	IDG Books Worldwide	Woodslane	(02) 9970 5111	\$54.95	0-7645-0334-0
Understanding Electronic Commerce	David Kosiur	Microsoft Press	Woodslane	(02) 9970 5111	\$44.95	1-57231-560-1
Web Commerce Cookbook	Gordon McComb	John Wiley & Sons	Jacaranda Wiley	(02) 9805 1100	\$81.95	0-471-19663-0



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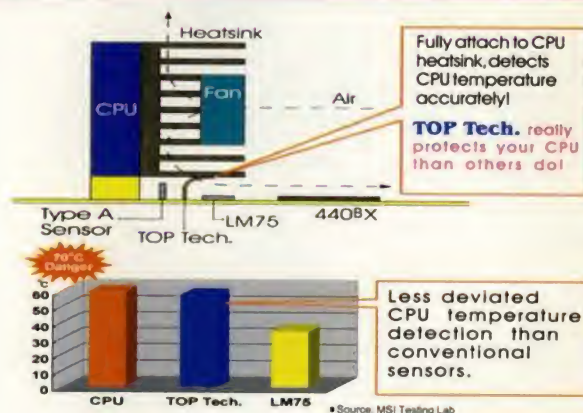
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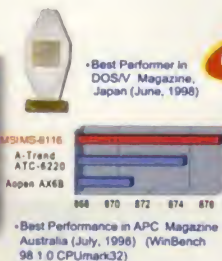
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- Cacheable Size: 512MB
- I/O: 2 Serial, 1 Printer, 2 USB ports, Floppy, IrDA
- BIOS: ACPI, DMI, PnP, Green
- Slot: 3 ISA, 4 PCI, 1 AGP. 30cmx18.6cm, ATX



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## The Human Body — Your Body

This title is based on the fascinating BBC Television series currently screening on the ABC. The first thing you should do is click on Overview, as the organisation of the different segments will be unclear without this short tour.

There are three main sections: Lifestages, Body Labs and You Watcher. The Lifestages segments move "through the journey of conception to death". When you first click on each each of these segments you hear a selection of sound bites, either from the narrator, or from various people experiencing that particular stage of life. Out of the context of the TV series, I found these pretty annoying and often inane: "That's why you married me — so I'd cook for you when you couldn't cook." Mother to son: "Leo, bring the shark back please." I stopped listening after a while.

Each segment also brings up a series of body cams. Click on a graphic and you get information about that life stage. This is presented as narration together with either video, graphics or still images, and text.

It is the video presentations that are the highlight of this CD. It is used to especially good effect in the Body Labs section. Here you can explore the body's eight most important systems. Study different sections with graphics and text, or opt for Explorer, which takes you through the whole of that system, often via video. Under Digestion, you can watch the whole videoed journey of a piece of food, from when it is being

chewed, through the digestive system, and on to its expulsion. I won't describe how it deals with that particular part of the proceedings — that would be telling . . .

The Labs also offer the opportunity to interact with the body functions: guide sperm on their journey to an egg, build your own circulatory system, or fight off antibodies space-invader style.

The third section, You Watcher, allows you to build a personal profile, and gives advice on exercise and diet. You can re-enter your details as you follow the program and check how you're progressing.

The Human Body is highly educational for pre-teens onwards, lots of fun for adults, truly interactive, and full of fantastic video sequences.

Lindsay Hayman

■ Publisher	BBC
■ Distributor	Roadshow Entertainment
■ Phone	(02) 9552 8700
■ Price	\$59.95
■ Requires	Pentium 75, Windows 95, 16M RAM, 4x CD-ROM drive, 16-bit colour display, Sound Blaster-compatible soundcard
■ Rating	★★★★☆

## French for the Real World

"Come on in, the language is fine." What a corny intro. Luckily for French for the Real World, the rest of this program is quite good. Forget that you are taking part in a road race in a country whose language you barely speak.

Discard the fact that the game can't accept race entrants from Australia, New Zealand or Great Britain. Ignore the bizarre appearance of Armand the Magnifique and the disturbing images of motorcyclists roaring down the wrong side of the road. The way this program helps to get you familiar with French is very user-friendly and amusing.

The would-be racer is partnered with the slightly spivvy-looking Stephane who talks gratifyingly slowly so dunderhead co-drivers can understand.



The aim of the game is to beat other racers who spend lots of their time gesticulating wildly, Gallic style, as they roar past you, or vice versa. Extra pace in the race is picked up by solving a series of word-related quizzes which reinforce spelling, vocabulary and aural skills as you match pictures to sounds and words, ask and answer questions or simply have fun at a variety of cartoon locations.

The race isn't all road rage though; every now and again the co-driver (you) has to leap out and collect things and send postcards. Smart types can opt for Verb Shortcuts, where they can strut their declension skills and forge ahead of the pack if they get it right — although some are a bit confusing in places.

The race meanders across France and takes in a variety of major towns, each of which has a brief note and a few piccies to make it more real. At the end of the race you get to chat back to the program and check your pronunciation after a week of français-fringed cabin fever with Stephane. For the beginner, a quite enjoyable and welcome change from the myriad stiff-as-a-board talking-book-style tutors.

Jeremy Torr

■ Publisher	Kaplan
■ Distributor	Dataflow
■ Phone	(02) 9417 9700
■ Price	\$69.95
■ Requires	486/66, Windows, 16M RAM, 4x CD-ROM drive, SVGA
■ Rating	★★★★

## Generations Deluxe Edition

When we reviewed genealogy software in the February edition of APC (see Gene Pool, page





## Interactive News

It's still very unclear just what we will be using to watch movies and TV in the near future, but one thing is definite — it's going to cost. Market research firm ACNielsen recently released details of its research into the future for High Definition TV (HDTV), and estimates that the shift from present TV units to HDTV will cost \$30 billion over the next 10 years. To receive images of the quality of which HDTV is capable you will have to fork out for an expensive new unit, but the Digital Video Broadcasting (DVB) television system that we look set to adopt will work with existing analog TVs, and will be capable of handling Internet access as well.

Whatever the result of the new TV standards, the next big push is into home sound for both TV and home computers. Creative Pacific recently unveiled its new Sound Blaster Live soundcard, which is being touted as an alternative of sorts to Dolby AC-3. Sound Blaster Live will use 'Environmental Audio Extensions' (EAX) to 'extend' Microsoft's Direct Sound and Direct Sound3D. For movies on your PC, the card uses Creative Multi Speaker Surround technology for a surround-sound effect, though a 'device' will soon be released to enable Dolby AC-3 Surround Sound. What it all seems to boil down to is that Creative has created an alternative to its main competi-

tor, Aureal, in PC surround sound, hedging its bets that the trend will develop towards PCs being used more as home entertainment devices that are analogous to TVs.

Giant corporations Sony, Matsushita and JVC are leading the push for the wide-scale adoption of Digital Video, a compression format based on discrete cosine transform (DCT). Digital video is a fast-growing market, used in digital camcorders, and increasingly with PC Cards for video editing. MPEG-2 is still the format of choice for distribution via satellite, cable and such like (including our probable HDTV standard), but in Japan digital camcorders are beginning to outsell analog ones.

101), we noted that Leister Productions had sold the Windows version of its excellent Reunion software to Sierra. This package, renamed Generations, is now available here.

More specifically, it is the equivalent of Reunion 4; a Version 5 edition is promised. This deluxe edition retains the user interface that impressed us so much earlier in the year.

The database limitations are unlikely to be a problem, with maxima of 30,000 individuals per file, 20 children per couple and 26 spouses per person. Date expressions such as "2 days after birth" are accepted and automatically converted to dates. The program knows 2000 is a leap year, and supports dates between 5000 BC and AD 5000.

Generations permits the storage of a variety of information in addition to the basic genealogy facts in either of two user-definable note fields or the miscellaneous field. These entries can be linked to source citations. EasyTree, a separate program within the package, prepares charts that may spread over multiple pages. Scanned photographs and other images can be linked to records and included in printed charts.

Data can be imported and exported in the widely-used Gedcom format, exchanged with Reunion for Macintosh, or exported in tab or comma-delimited format for a spreadsheet or database software.

In addition to an extensive manual, a copy of the book *Netting Your Ancestors* is included. It offers some useful suggestions for starting points for research as well as subject-specific Netiquette. Despite an overall US orientation, resources for a variety of countries are mentioned.

All told, a useful and attractive pack-

age, but we'd rather pay less for a version without the data discs.

**Stephen Withers**

■ Publisher	Sierra
■ Distributor	Dataflow
■ Phone	(02) 9417 9700
■ Price	\$99.95
■ Requires	486/66, Windows 3.1, 12M RAM, CD-ROM drive
■ Rating	★★★★

## Titanic — An Interactive Journey

This CD has some brilliant underwater video footage; a controllable 360° virtual submersible creeps around the wreck of the Titanic showing what life (death, actually) is like two-and-a-half miles below the surface. Image quality is right up there with the best.

It also features such trifles as a newspaper story headlined 'Dogs In Hotels Shock',



quite a few virtually unrelated mentions of US politicians including Henry Ford and Senator Smith (who?), a map of New York offering advice on places of interest and a list of Titanic rescue and salvage trivia that would

amaze the most dedicated Trivial Pursuit player. (Some scientists advised sinking a tanker full of liquid nitrogen on top of the Titanic. The surrounding water would then freeze, so the ice and the encapsulated Titanic, would float to the surface. Duhhh.)

Most of the CD is based on either still photos or drawings accompanied by narration or text explanations. This is a better use of available storage space than lots of video, but can be a bit tedious if you have to wade through yet another series of loony salvage ideas, or more thinly disguised adverts for IFRAMER (the French organisation that led the expedition) to get to the section you want.

The best section is probably the one on the selection of artefacts salvaged from the wreckage. These are extensive, beautifully photographed and, if you can ignore the saccharine captions, very informative. The disc contains over 600 pictures and 200 original illustrations based on the post-wreck inquiry held in New York, but much of the narrative has been paraphrased down and given a quick, easily assimilable editing treatment to produce many gasps of breath but little in-depth analysis. To some extent this removes the feel of history, but the CD is still a good buy for those who have that surprisingly common fixation for old things and human tragedy rolled into one.

**Jeremy Torr**

■ Publisher	Europress
■ Distributor	Europress
■ Phone	(02) 9748 4847
■ Price	\$49.95
■ Requires	486/33, Windows, 8M RAM, 2x CD-ROM drive, SVGA
■ Rating	★★



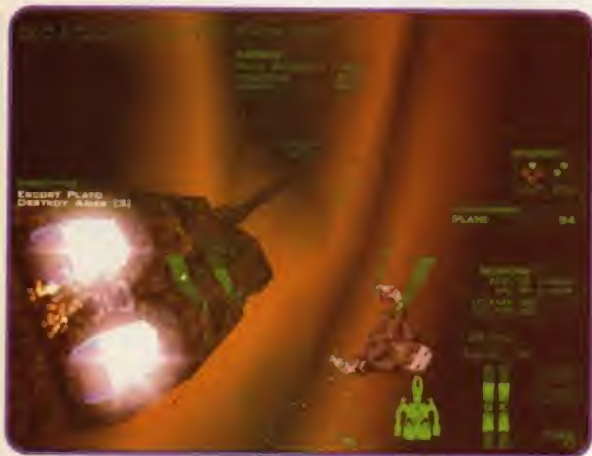
*There are battles aplenty in GameZone this month. Then again, you may prefer a quiet spot of fishing . . .*

# To your battlestations!

## Descent: Freespace, The Great War

I hereby nominate Freespace for a 'Best Use of 3D Acceleration' award. It's also a damn fine space game, and its only connection with Descent is shared programmers.

You can play Freespace without a 3D card, but if you do own one, you're in for the ride of your life — not just because the



card graphically enhances the game, but it also gives it a speed boost (from either 3Dfx Glide or Direct3D).

Many games drag 3D cards down through overuse of textures and complex objects; but everything in Freespace is so well optimised that amazing events become possible without noticeable slowdowns: spaceships that are several kilometres long, displayed in awesome detail; epic battles between vast numbers of craft; scary aliens, believable AI; massive explosions with real debris; terrific audio; a mission editor; and multiplayer combat in space.

Slick programming also means the game is highly configurable. The amount of features in the cockpit HUD and settings on the options screen will please tinkerers and simulation fans (despite the unrealistic space flight model). Patch updates can be downloaded online from within the game itself, and the mission editor is quite usable. In fact, Interplay will include some user-designed missions in its upcoming level pack.

On the downside, Freespace's plot is linear (unlike a Wing Commander game, where the player's actions affect the storyline) and the cinematics are predictable. APC also experienced problems with the sound, which dropped out during cinematics on two PCs.

The only character development is your own, which makes this single-player game a lonely trek through a world that is supposed to be full of comrades. One solution is to keep reading the professionally written Freespace fiction, which appears weekly at <http://www.interplay.com/freespace/> (or you could submit your own). Successful play over the Internet requires way too much bandwidth, which means it's hard to find players and you'll find yourself wishing for a LAN.

Freespace has a superior engine and better mission design than any rival space sim. It's a thrill to play and therefore a worthy purchase for space fans; but it doesn't quite manage to suck the player into the main plot.

**Simon Vandore**

■ Distributor	Electronic Arts
■ Phone	(02) 9955 7744
■ Online	<a href="http://www.interplay.com/">http://www.interplay.com/</a>
■ Price	\$89.95
■ Requires	Pentium 166 or Pentium 133 (with 3D accelerator), 32M RAM, 6x CD-ROM drive, DirectX 5.0
■ Classification	G 8+
■ Rating	★★★★

## MechCommander

"Mech fall over. Go boom." So a Battletech-obsessed friend of mine kept saying as I played MechCommander, the latest in a long line of Battletech-inspired games.

Microprose is well known for producing high-quality strategy/management games, and its first MechWarrior game seems to be continuing this tradition. MechCommander plays somewhat like a

cross between Warcraft and Syndicate on a Civilisation II map.

Instead of the most recent games, which gave you control over a single MechWarrior, MechCommander gives you command over multiple Mechs at one time. Thanks to the extremely intuitive command interface, this is much easier than it might seem. The command interface is primarily mouse-based, although after a while you find yourself using a keyboard/mouse combination.

MechCommander incorporates a good learning curve — early missions allow you to explore, get used to controlling your Mech squads and sort out some simple tactics. Later on, things become more complex, and you find yourself commanding one squad to run interference so that you can sneak-attack bigger Mechs while capturing vital supplies . . . while under aerial attack.

Graphically this game really stands out, from the detailed maps to the close-up views of the Mechs themselves. It is full of great little touches, such as damaged Mechs and exploding high-detail scenery. This high-quality approach is also carried over to the sounds: your troops react to events, panic when in trouble, and scream in terror when forced to eject.

MechCommander should appeal to strategy freaks and those looking for a suitable (and not too difficult) strategy game.



Oh, and, of course, the 'Mech fall over. Go boom' crowd. But in their case MechCommander is preaching to the converted.

**Alex Kidman**

■ Distributor	Microprose
■ Phone	(02) 9953 8788



■ Online	<a href="http://www.mechcommander.com/">http://www.mechcommander.com/</a>
■ Price	\$89.95
■ Requires	Pentium 133, 16M RAM, 4x CD-ROM drive, 150M hard disk space
■ Classification	G 8+
■ Rating	★★★★

## Might and Magic VI: The Mandate of Heaven

Apart from Interplay's innovative Fallout, there has been a sad lack of good role-playing games (RPGs) on the market over the last few years. For the RPG fanatic, however, the next year looks like being a bumper one, with some very impressive titles on the horizon, such as Fallout 2, Baldur's Gate, Diablo 2 and Ultima Ascension. Heading this crop is the latest episode in the long-running Might and Magic saga: Might and Magic VI: The Mandate of Heaven (MM6).

MM6 is a very traditional first-person RPG, in the style pioneered by the likes of the Eye of the Beholder series. It's set in a typical fantasy milieu, has the usual array of character types (knights, sorcerers, clerics, druids), spells (fireball, anyone?) and monsters (skeletons, dragons, wizards). Nothing terribly new there.

What is so good about MM6, however, is how well the game is executed. All the annoying things in previous RPGs have been taken care of. Prefer turn-based combat? It's an option. Or you can just use the default real-time combat. Annoyed at having to scroll through a massive list of spells every time you want to cast? Just ready a quick spell (in any case, they're arranged so you can find the spells you want easily). Notes, mapping, hints, quests, locations — they're all taken care of.

The plot is extremely non-linear: you can travel around the vast world, completing an array of miscellaneous missions (there are

over 50 significant quests) at will, building up your power and equipment, and readying your characters to deal with the menace that threatens the land of Enroth — an invasion of demons.

To complete all the missions in game time would take years, and you have the feeling in real-time it will take just about as long. There are easily months of play time available.

If you're looking for the latest and greatest in 3D graphics rendering engines, look elsewhere. This isn't Unreal. That said, MM6's graphics and sound are a cut above most other 3D RPGs — although it did tend to stutter a bit on lower end machines (we even experienced poor performance on a 200MHz Pentium). It's all software driven, so you don't need the latest and greatest 3D cards.

It isn't technical brilliance that makes a good RPG, however; it's plot and gameplay, and this is where Might and Magic really shines. It is easily one of the best RPGs ever released.

Nathan Taylor

■ Distributor	Directsoft
■ Phone	(02) 9482 3455
■ Online	<a href="http://www.3do.com/mm6/">http://www.3do.com/mm6/</a>
■ Price	\$63
■ Requires	Pentium 90, Windows 95/NT, 16M RAM
■ Classification	M 15+
■ Rating	★★★★★

## Trophy Bass 2 Deluxe

Anglers of the world — no longer do you have to endure the physical tortures often associated with going fishing; no more travelling to secluded fishing holes, no more face-numbing wind and no more waiting around for a bite that will never come.

Playing Trophy Bass 2 on the PC may not be quite the same as an outing to the lake, but you would be hard-pressed to find a better substitute. This game gives you the pleasure of a simulated fishing trip, and it may also teach you some of the finer points of the art of fishing, which you can try out next time you're getting your feet wet... well, your boots anyway.

There are 15 American lakes on which to fish. Photographic and



topographical maps, together with the accurate layout and depths of each of the lakes, brings an element of realism to the game. A large navigational map allows you to direct your boat with the arrow keys, while a sonar display indicates where the fish can be found.

As with conventional fishing, the process of selecting the correct lure, rod and casting style is an important aspect for enticing, hooking and landing a fish.

Single-player games can be played as either quick trips, tournaments or careers. Teaming up with or competing against fellow anglers from around the world certainly beats playing by yourself. The WON Internet game facility can be accessed with little fuss and there is always a decent number of players to go fishing with. You can also play multiplayer games on a LAN or via modem.

Difficulty levels range from easy to hard, and the game can be customised for a level of realism that is right for you. The elements of realism that can be adjusted include the population density of fish, the visibility of fish in the water and the ease with which a fish can be landed.

Getting the difficulty settings right is the key to an enjoyable day on the lake. Too easy and the fish will be jumping into





# MicroGram Computers

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This kit comes with all the hardware components required to build a 100Mbps network for two PC's as well as a comprehensive installation manual. All

software is part of Win 95/98/NT. The 100Mbps Network Starter Kit provides the most cost-effective solution for users who desire fast throughput at the cost of traditional 10Mbps. The kit includes one 4 port 100Mbps Fast Ethernet hub, two 10/100Mbps PCI Fast Ethernet adapters, two 5 metre Cat. 5 network cables and software drivers for the adapters.

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the boat; too hard and you'll want to throw in the towel. Or the rod, as the case may be.

Kieran McNamee

■ Distributor	Dataflow
■ Phone	(02) 9417 9700
■ Online	<a href="http://www.sierra.com/">http://www.sierra.com/</a>
■ Price	\$69.95
■ Requires	Pentium 90, 16M RAM, 4x CD-ROM drive, 100M hard disk space (supports Microsoft Force Feedback joystick)
■ Classification	G
■ Rating	★★★

## Xenocracy

Space combat fans have been well served recently, with several quality games hitting the shelves, including Wing Commander: Prophecy; Descent: FreeSpace (reviewed here); and X-COM: Interceptor. Even LucasArts has reissued the venerable X-Wing series, updated to take advantage of the latest graphics hardware.

Often when a genre becomes crowded, the new kid on the block has a hard time offering anything original or compelling. Xenocracy is a case in point.

It is the year 10,600, and the solar system superpowers are waging a covert war over access to the vital ore Lycosite (yes, another game in which mighty economies are strangely dependent on a single commodity). Keeping these competing forces in check is the United Planet



to respond to each planet's calls for help, choosing combat missions that you judge will best maintain the balance of power in the solar system.

The game has an arcade mode for those who prefer to go straight to the action. If, however, you enjoy diplomacy and resource management (albeit somewhat rudimentary), then choose the full simulation. Here you can make use of comprehensive databases and audiovisual briefings to configure your missions. Unfortunately, this background information often seems peripheral to the plot, making the game less immersive than it might otherwise be. Even with the briefings, it can still be dif-

ficult selecting missions that match your present level of expertise.

The flight and fight aspects of Xenocracy are good. It incorporates attractive 3D graphics and an easy-to-master interface. For those who have played X-Wing, the controls will be especially familiar: there is an identical use of radar, and the same balancing of power between shields, engines and weapons. While this might initially seem an advantage, in the long run it is symptomatic of the game's most serious problem — in an already crowded category, it needs to offer a little more originality.

Jon Gill

■ Distributor	Teco Multimedia
■ Phone	(03) 9720 9833
■ Online	<a href="http://xenocracy.grolier.co.uk/">http://xenocracy.grolier.co.uk/</a>
■ Price	\$79.95
■ Requires	Pentium 133, Windows 95, 16M RAM, 4x CD-ROM drive, 2M SVGA video card, joystick recommended
■ Classification	G 8+
■ Rating	★★★

● more reviews on [apcmag.com](http://apcmag.com)

## Games News

● The demo version of Sin has been released, and it's a hefty 45M download. A few words of caution, though: first, only download the demo from a reputable source, such as Activision itself or one of the sites it nominates, or from a magazine cover CD. A few third-party sites contained versions of the demo that were infected by the CIH virus, which can be very hazardous to your PC's health. Secondly, once you do get hold of the demo, prepare yourself for an introductory sequence that replays every action-movie cliché in the book, replete with terrible overacting and woeful dialogue. Even so, it's a great game and well worth a look.

● It is with sadness that Gamespy has to report the death of one of the best games developers ever. Dani Bunten Berry was responsible for such classics as M.U.L.E., Modern Wars, and Seven Cities Of Gold,

among others. She was one of the pioneers of multiplayer gaming, and her influence over designers and developers is still pervasive today. She was recently honoured at the Computer Game Developers Conference with a lifetime achievement award. You can read some of the tributes at <http://www.mpath.com/dani>. ● You might remember the fracas that developed over the initial release of Derek Smart's awesome Battlecruiser 3000AD, when publisher Gametek released the game before it was finished and claimed ownership of the product, leaving Smart with a court case on his hands. Well, Smart is back, and 10 years after the inception of the project he's almost ready to release the final version — Battlecruiser 3000AD 2.0: The Developer's Edition. Those who have already purchased the game will be able to download a patch free (though it won't work with the free version carried on many magazine cover CDs). To top it all off, he has announced that the sequel is already in development!

Gamespy



Nations (UPN), a kind of interplanetary parent whose task it is to carefully play the squabbling planets off against each other in a continuous struggle to avoid all-out solar war.

You play the WingToucher, commander of an elite UPN squadron. Your task is



*Reviewing the reviewers: sites and samples of music reviews online.*

# The food of life

## Addicted to Noise

Careening from folk music to R&Bs lite, Addicted to Noise tries to be all things to all people. While it may not succeed on this level, it is an interesting window to some new music which is otherwise ignored by mainstream media.

The site is easy to navigate, with side tabs delineating reviews, features, news and columns. The ability to flick between sections soon loses its sheen, however, thanks to the site's poor dial-up performance. Similarly, since I lost patience just waiting for pages to load, I didn't even attempt playing the music samples.

The site features writers from both Australia and the US and provides fairly good coverage of Australian bands and the local scene, including news on independent record labels. Most of the other content appears to originate from the US — one feature, on Midnight Oil's latest release, was the only exception.

Despite its fairly naff name, Addicted to Noise is not just a vehicle for the same old middle-of-the-road records heard everyday on mainstream radio. Care has been taken to include all music styles, including often ignored folk and country



music. Hip Hop and R&B, which is often excluded by Australian radio and music press, are present in both the reviews and features. There's also a nice blend of well-known performers and newer acts.

The columns featured on Addicted to Noise include artists that will never make the Top 40. The choice of topics and style of the columns are idiosyncratic, and, like most of the content on the site, lack the annoying slick music-speak of most popu-

lar culture writing. Highlights include a story on Woody Guthrie, a 1940s folk artist, depicting how Guthrie's music inspired many later artists despite his limited acceptance in the mainstream. Another example is the column on French rap. The author, an American, although he is bemused, approaches the subject seriously, comparing the French style with the more well-known American version.

The site could also be described as a mile wide and an inch thick. Don't expect comprehensive coverage on any particular music style; instead, appreciate the opportunity to broaden your musical horizons.

**Deanne McIntosh**

Online <http://www.addicted.com.au/>  
Rating ★★

## Pitchfork

Daily music reviews, off-beat interviews and a large selection of music that isn't entirely mainstream is the substance of Pitchfork.

The site is divided into five sections: Reviews, Interviews, Columns, Special Reports and Live Photos. Reviews is the most comprehensive: four music commentaries are posted every weekday, and give ratings out of 100. Each review is accompanied by a 32-second MPEG-2 sound clip.

The reviews are humorous and often take an unusual approach. In a particularly unfavourable review (it only scored 35% on the Pitchfork scale), Michael Sandlin attributes this comment about the group Swell to American TV character Captain Kangaroo: "Swell's 'For All The Beautiful People' does remind me of a strawberry pop tart". The disclaimer at the bottom states: "This review is a piece of satirical fiction. We did not interview Wilford Brimley, the deceased Captain Kangaroo, or Tabitha Soren . . . Michael Sandlin's comments on Swell's recording, however, do represent his actual opinions". Quite a few Q&A reviews contain similar disclaimers.

The Verve's third album, 'Urban Hymns', is described as mimicking "the feeling one gets the day after being bed-ridden sick forever and walking out into a 59-degree cool, fresh, lung-numbing Octo-



ber morning to have a picnic of herbal tea, citrus, and damn good donuts with your lover". It scored 89% — an Excellent rating, just short of the Classic category. A sample of one week's reviews included: Bauhaus, Heather Nova, Lionrock and Social Distortion.

The Interview Archive was "undergoing some major reconstructive surgery", when we entered, although the changes look promising. There is no search function but articles are listed in alphabetical order by artist, and date back to February 1996. The archive contains nearly 100 interviews which tend to take a fun, light, and lively approach. The writers are refreshingly honest and don't hold back if they think an album is no good. If the Australian Office of Film and Literature classified this site it would probably label it 'medium level course language and adult themes'.

The columns are not as up-to-date as other sections; the fash! section contains only four columns, all posted in 1997. The Three Blocks From Groove Street columnist is a little more prolific. In one column he wrote about how he ended up unemployed, and included a letter of his performance assessment.

The most disappointing section is Live Photos, which only had two postings when we visited — four not-very-good photos of The Smashing Pumpkins playing live in Minneapolis and six shots of The Creatures. Since both were new postings in August, there will no doubt be more soon.

The rest of the content is regularly posted; interviews and special reports are posted almost every week.

Pitchfork's main downfall is that it isn't very well maintained — a lot of the



interviews are old and the pages haven't been updated, so some of the links don't work.

Claire Waddell

■ Online <http://www.live-wire.com/>  
 ■ Rating ★★★

## The Den

Album reviews are the lifeblood of any music publication claiming to be even moderately comprehensive. The anorak wearers among music fans — you know you're one when, despite having a pathological loathing for Stevie Nicks, you read a Fleetwood Mac album review anyway — love record reviews for the scope and useless trivia they provide. Once you're familiar with a particular writer's style and preferences, reviews can also become useful buying guides.

The Internet should really be the ultimate resource for review aficionados. Unlike conventional music magazines, the only production schedule binding Internet publications is the energy and zeal of those that produce them — which makes it a real pity that it's so difficult to find music publications online that take advantage of this freedom.

The Den tries very hard to use the Net to its full extent without overtaxing its readers with meaningless and endless downloads of video clips, sound clips and other multimedia bandwidth eaters. It provides daily record reviews, music news and interviews, along with a daily TV and movie section. Its daily updates of UFO and alien sightings worldwide will appeal to sci-fi geeks.

The problem with The Den is that its reviews are predictable, both in tone and subject matter. It restricts itself to what Americans broadly label 'alternative' material. Sadly, this categorisation ignores far more than it covers. What would traditionally be called 'pop' doesn't get a guernsey; nor does metal, non-mainstream electronic, blues, classic reissues or ambient. Review writers don't get a byline either, so it's difficult to establish a rapport with any particular writer.

The Den's archive could be the site's real saving grace, but without a search engine it's a little difficult to find a particular group quickly. This problem is compounded by the practice of grouping reviews in the order in which they were posted, making it well nigh impossible to make a rational guess about where a particular review is archived.

That popular music tastes are driven by

## Surfbaud: The year punk broke

In 1977 the Sex Pistols released 'God Save the Queen' on an unsuspecting public, in the process inspiring a whole generation of youngsters who thought 'if they can do it, so can we'.

Paradoxically, the Pistols were almost the antithesis of everything they came to represent; with the exception of the bass player, whose amp was often turned down during gigs, all were accomplished musicians. Their image, allegedly a reflection of street culture, was in reality carefully constructed by their manager Malcolm McLaren and designer Vivienne Westwood.

But the movement they inspired, as contrived as it was in the beginning, became a legitimate expression of youthful angst and came to represent the zeitgeist of an entire generation. And for every thousand kids that thought 'I can do that', and failed dismally, there were one or two who succeeded. The key message of punk was that central to rock there was a DIY ethos — a message reflected 10 years later in Sonic Youth's *TeenAge Riot* (I've got a chord and a pedal . . . and that'll do for now), and 10 years after that in Beck's *Where it's at* (I've got two turntables and a microphone).

The Web, when it burst Sex Pistols-like into the public consciousness in 1994, was largely propelled by the same DIY ethos that drove punk. The catchcry 'Information wants to be free!' reverberated around the world. I've got a modem and a computer . . . and that'll do for now.

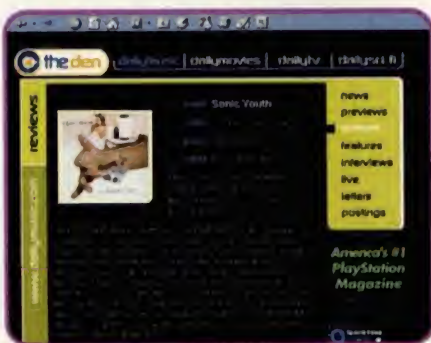
For a brief, fiery moment people believed that it was possible to publish and compete on the same terms as the estab-

lished media, just as it was possible for the Pistols to come from nowhere and compete with the hoary old supergroups and disco queens of the '70s. This attitude was encapsulated in the phrase 'on the Internet, no-one knows that you're a dog'.

Just as some were able to parlay punk into a successful career — groups like the Cure and individuals such as Talking Heads' David Byrne come to mind — some individuals and organisations have been able to turn the Web's early punk drive into a career. The difference between Yahoo's Jerry Yang and Netscape's Marc Andreessen is that while David Byrne and the Cure's various members might be comfortably wealthy, the computer guys are in possession of paper wealth measuring billions. No rock star, nor any musician, with the possible exception of Andrew Lloyd Webber, has ever become this rich.

Success in punk, and in Web ventures, is determined by the confluence of a number of factors — not the least of which is pure luck. Success is also determined by wealth obtained through the backing of established entities. Netscape and Yahoo obtained venture capital, undertook IPOs and became corporations themselves. The Sex Pistols were originally signed and quickly dropped by record label EMI (after a healthy advance had been paid). Virgin records picked them up and provided the production and distribution facilities that enabled the public to buy 'God Save the Queen'.

In both areas, the original driving ethos was quickly undermined by raw commercial reality. Punk and the Web sold out.



spin doctors and image makers lurking in the back rooms of record companies is obvious to anyone with a modicum of interest in music. Publications that are able to see through this spin, even if they agree with it, are valuable. Publications

able to take a historical perspective while avoiding an 'everything was better in the '60s' tone are even more so.

The Den is neither of these. It's a devoted slave to fashion, happily regurgitating record company spin as 'news' and 'reviews'. In fairness, this is probably exactly what The Den's audience is after — they want to know what's in fashion. They want security and the knowledge that there are a lot of people out there who are just like them. Music aficionados, however — better described, perhaps, as snobs — should give the site a wide berth.

Josh Gliddon

■ Online <http://www.theden.com/>  
 ■ Rating ★



# Annual Report 1998

Matrox Graphics Inc. sets record sales for 1997-1998 of \$300 million US

Matrox Graphics Inc. today posts record sales of \$300 million US for the 1997-1998 fiscal year - confirming the company's number one position in the highly competitive graphics industry. A major contributor to this success is the Matrox Millennium chip technology that powers the industry standard Matrox Millennium and Mystique high performance graphics accelerators. Matrox Graphics Inc., designer and manufacturer of graphics and video chips, is a separate division of privately held Matrox Electronic Systems Inc. founded in 1978.

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# matrox



# Chip Chat

## Star power

An increasingly disturbing trend in recent months has been the move to treat people in the IT industry as bona fide celebrities, the kind of people whose lives are endlessly deconstructed by *Woman's Day* and *Who*. Bill Gates is of course the most obvious example of this phenomenon, but Steve Jobs, Larry Ellison and a handful of others are all now regularly receiving tabloid coverage. For instance, the news that the US network TNT is making a movie, tentatively entitled 'The Pirates of Silicon Valley', about the software wars between Microsoft and Apple in the 1980s, has received extensive coverage. Übergeek Anthony Michael Hall has signed up to play Gates, while 'ER' star Noah Taylor was under active consideration to play Jobs. Don't start queuing; the flick isn't due until 1999.

Hot on the heels of that news came the revelation that Microsoft co-founder Paul Allen had lashed out, spending unspecified but large amounts of money to throw a weekend bash for Gates in Alaska aboard the luxury cruise liner *Crystal Harmony*. The guests attending the event reportedly included James Cameron, Candice Bergen, Dan Aykroyd, Penny Marshall and Jeff Goldblum, the ever-reliable Mr Showbiz Web site reported. Must have made for some fascinating deckside conversation.

"So Bill, are you embarrassed by the bad press for Windows 98?"

"Well, no, Jeff. I'm just glad I didn't appear in 'Independence Day'."

At Chip Chat, we dislike this trend, and we've spent some time working out why:

- Most people in the IT industry are ugly, and we don't want to see full-colour pictures of them in their underwear.
- Most geeks don't have interesting sex lives. (Larry Ellison is the exception that proves the rule.)
- The world isn't yet ready for stories of tantrums thrown by developers during their latest project. Imagine it: "Gates said he was leaving the massive Windows NT 5.0 due to 'creative differences' with director Steve Ballmer, but sources indicated that the real problems began

when he began openly flirting with Ballmer's PA on the set." Oh, all right then, maybe we are ready.

## Porn free

One of the more amusing emails received in the APC Webmaster's office recently invited us to submit our site's URL to the world's "largest collection of porn sites". Now we know that there are some fairly dirty tricks played in the technology industry, but this is ridiculous. (Check out <http://apcmag.com/porn/> if you don't believe us.)

## Hey! It's the McSmartCard!

The most famous historical association between McDonald's and the world of high technology has been the tendency for geeky types to consume large quantities of the former while developing even larger quantities of the latter. That,

though, may all be about to change. McDonald's in Germany ("Ich wünsche einen grossen Mac") has begun trialling the use of smart cards in its stores, which would allow people to download and store cash on the cards for spending in McDonald's and elsewhere. Participants are reportedly going to receive 'frequent burger' points, allowing them to expand their consumer spending patterns as well as the well-stocked coffers of Maccas franchisees the world over.

## Search park

In the very-little-pretence-to-relevance department: if you do a search on the phrase 'Oh my God! They killed Kenny!' (the catchcry of the world's best animated show, 'South Park'), you will find approximately 900 sites. Oddly enough, though, if you replace 'Kenny' with 'Bill Gates' or 'Steve Jobs', absolutely nothing shows up. Now there's a parody site waiting to happen. ■

## Contest: Technology gag of the month

When we announced our Technology Gag of the Month contest last month, we didn't expect such a spectacular response. Chip Chat's email inbox has been flooded, and we'll soon be creating a gags database online to keep up with the influx of information.

This made choosing our inaugural gag all the more difficult, but we eventually went for this gem, submitted by Tim Dixon:

Three engineers — an electrical engineer, a mechanical engineer and a Microsoft engineer — are travelling to a computer conference when the motor in their car stalls and they are stranded at the roadside.

The electrical engineer examines the engine and proclaims the fault is not

electrical, so he can't fix it. Likewise the mechanical engineer, after a few minutes under the hood, says the problem is not mechanical either.

At this point the Microsoft engineer steps from the car and says "I have an idea! Why don't we try closing the windows and opening them again and then see if it starts?"

**For his trouble, Tim has won a pair of Windows boxer shorts, which should be good for a laugh.**

**But we're still keen to see more. Send your jokes — the shorter and funnier the better — to [chipchat@acp.com.au](mailto:chipchat@acp.com.au). If we publish your joke, you'll win another equally alluring prize.**





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